VOL. 174, NO. 2 AMERICAN FEBRUARY, 1951

Gas Journal

MAR -2 1951

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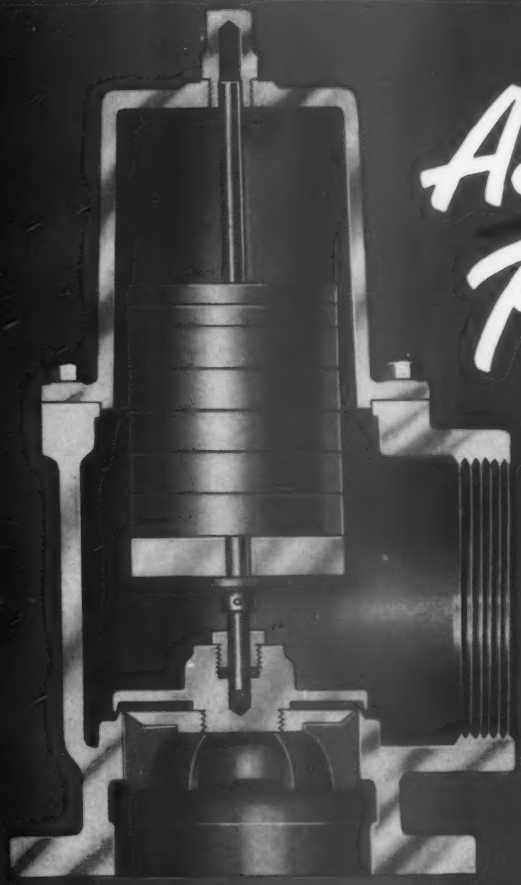

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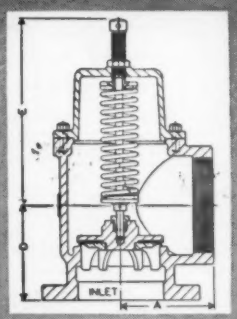

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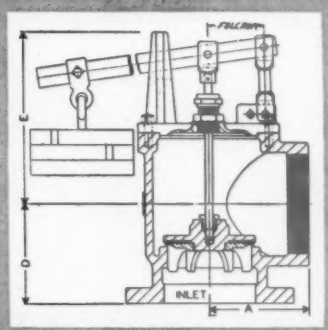

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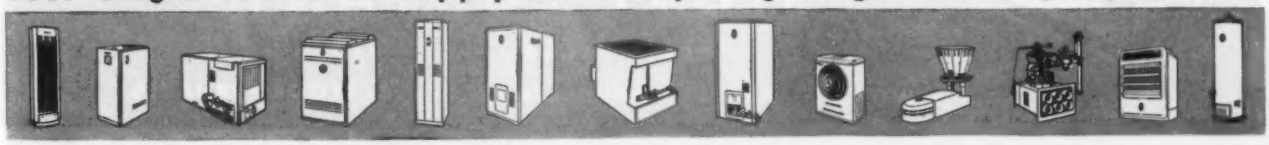

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AMERICAN Gas Journal
ESTABLISHED 1859

VOLUME 174 FEBRUARY 1951 NUMBER 2

This month...

This month we welcome Charles R. Bellamy to the JOURNAL staff as our technical editor. This is hardly more than belated recognition of the service he has already been rendering us ever since he undertook the revision and modernization of AMERICAN GAS HANDBOOK, 1951 edition, of which he is editor. As an independent gas consultant, Mr. Bellamy uncovers more new industry developments in a week than a typewriter editor is likely to encounter in a year. It is very solidly encouraging to have him with us.

Over a glass of relaxing Vichy water, we learned the other day that AGA is entering its fifteenth year of national consumer advertising. Since 1936 when James F. Pollard, then of Seattle, succeeded in needling the national industry into its first domestic and residential campaign, the program has been running without interruption. But we couldn't help observing that in those years the national consumer advertising appropriation has only grown from $425,000 to $660,000, while total gas sales climbed from $777,349,000 in 1936 to $1,958,000,000 for last year. Our congratulations to the participating companies are tempered, perforce, with some perplexity. How conservative can an industry be and still expand?

We are indebted to the *Gas Journal* of London for a statistical tid-bit that we must confess had never occurred to us. Quoting AMERICAN GAS JOURNAL as its authority—and a wise choice we deem it—our British contemporary advises its readers that some of the recent pipe lines built in the United States would extend from "Lands End to John o' Groats and back again." The atlas is right there on the shelf under the window.

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Elliott Taylor · Editor

Howard F. Weeks · Associate Editor

Charles R. Bellamy · Technical Editor

Arthur Rohman · Western Editor **John F. Falvey · Financial Editor**

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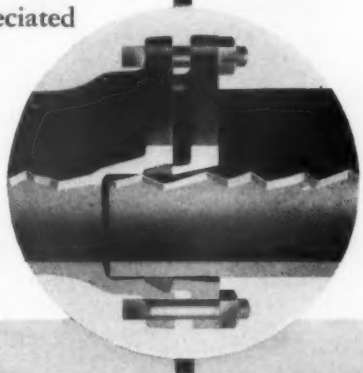

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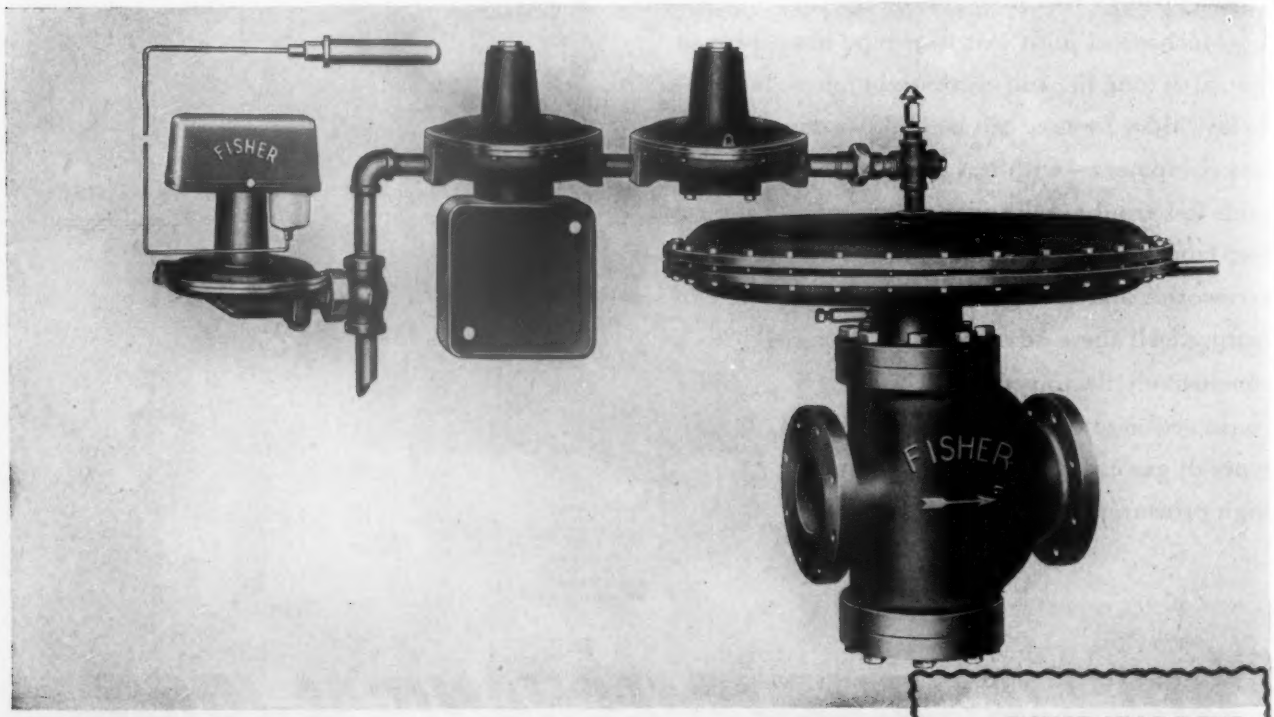

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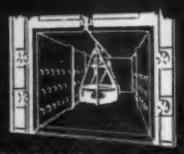

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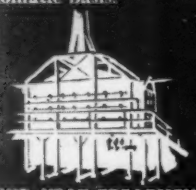

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Editorial:

Keep Gas Ranges Gas

REPORTS should be due before long on the national operating tests in which 2,000 gas ranges equipped with either automatic or single point ignition systems are being checked under conditions of actual use, in the homes of gas customers.

For many years gas appliance merchandisers have been crying the need for some form of automatic ignition that would put the gas range on a par with electrical equipment from a control standpoint. Until recently the only answer had been the standing type of pilot for top burners, ovens and broilers.

This type of ignition, while satisfactory from an operational standpoint, had one serious disadvantage. As modern ranges, with divided tops, high broilers and separated ovens came on the market they sometimes required as many as four pilots burning continuously to keep a single range ready for fully automatic operation. Electric range salesmen were industrious in pointing out and exaggerating the undesirable effect of four pilot lights burning in the kitchen at all times.

That the competitive handicap was as real as it was fancied, we are inclined to doubt. But it did exist, and when a prospective purchaser has been properly primed by the opposition, any objection no matter how minor, can be built up to the place where it looms as an insurmountable barrier to a gas range sale.

The new devices now being tested fall into two categories. The first, called the single point or flash tube system, does not eliminate the gas pilot entirely, but reduces it to one to a range, and relies on a slotted tube to carry the flame from a central point to the burners to be used.

The alternative to the single point or flash tube, is electrical ignition. In the latter system, an electrical coil is placed near a pilot burner tip. When the gas is turned on a simultaneous electrical contact is made, causing the coil to glow and ignite the gas.

There is little doubt that the electrical device has a head start in the race for supremacy in the new and more fully automatic type of gas range ignition. Of the ranges now on test about 1,200 are electrically ignited, while the remaining 800 are using variations of the flash tube. Had it not been for the tireless private research of a few straight gas companies, it is highly improbable that flash tube ignition would have been developed to the place where it was ready for testing simultaneously with the electrical apparatus.

Assuming that the tests will show that both systems perform satisfactorily, the gas industry will shortly be faced with the question of which type of ignition is to receive the utility and manufacturer support necessary to give it widespread consumer acceptance.

When the question arises, we are solidly behind the proponents of the all gas range and the single point ignition system that leaves gas free of any reliance on its most serious competitor in the cooking field, electricity.

We are advised that among the advantages of single point ignition will be a lower first cost for the device itself; a lower installation cost due to the elimination of an electrical outlet; and freedom from the possible risk of local union rules requiring the servicing of ranges by employees of electrical service organizations.

The argument may be advanced that with one pilot light burning, the range cannot be called cold, when it is not in operation. From a practical standpoint that is a distinction without a difference. The single pilot can be located so that to all practical purposes even the housewife would be unaware of its presence. This was amply demonstrated in a so called "mystery" range exhibited to the American Gas Association in Atlantic City. There a small pilot concealed in the backrail actuated, through flash tubes, all of the top burner, as well as oven, pilots. Any gas appliance salesman that can't overcome the vague and indecisive objections that may be raised to a single pilot on a gas range belongs in the electrical field where all of his thinking is done for him.

The portion of the gas industry that is solidly behind gas for cooking has just cause to view with misgivings any device that relies on an electrical connection as an essential operating function of the gas range. During the recent Thanksgiving day storm along the Atlantic seaboard there were large areas that were without electricity for days. The only spark of comfort and convenience in thousands of homes was the gas range and water heater. Had the stoves been dependent on electrical ignition they would have had their "cold range" program with a vengence.

The fight between gas and electric cooking is a tough battle. The very survival of the domestic gas industry depends on retaining the cooking load. We can see no justification for developing and promoting a device that would make the operation of a new gas range contingent on an electrical connection. The electric range salesman would argue, with all of the logic on his side, that if electricity is to become essential to the operation of a gas range, why not purchase an all electric model in the first place.

Provided, of course, that the tests give assurance of proper performance, we believe that gas flash tube, single point ignition system should be the one endorsed and supported by the gas industry.

Elliott Taylor

Intensive Search for Gas Indicated for Canada

by John F. Falvey

THE year 1951 promises to see the start of the greatest search for natural gas in the history of the Province of Alberta, Canada.

This is indicated in the report of the Petroleum and Natural Gas Conservation Board of Alberta, released on January 25 by Premier Ernest C. Manning.

The report points out that proved gas reserves of the Province now are just about sufficient to take care of Alberta's own estimated requirements for the next 30 years and that pipe line companies or others interested in making gas available for export across provincial borders will have to depend for their supplies on additional reserves still to be found.

Probable recoverable gas reserves of Alberta are placed in the report at 4.439 trillion cu. ft.

This is about in line with the 4.5 trillion cu. ft. which the Province considers it will have to conserve to take adequate care of its estimated 3.06 trillion cu. ft. internal consumption over the next 30 years.

While the break-even situation now existing between gas reserves and estimated provincial requirements precludes immediate granting of a permit or permits to export gas from the Province, the board is keeping an open mind on the subject and recommends at least one step which might facilitate the finding and proving up of additional reserves.

In its report the board puts squarely up to the pipe line companies the job of uncovering additional reserves with which to firm up their applications for permits to export gas.

It agrees with geological estimates that underground reserves may be substantial and that export restrictions and the lack of really large markets in the Province itself have militated against development of gas reserves at a faster rate than has been shown to date.

With a view to stimulating the domestic markets the board recommends development of storage projects as a means of correcting present unwieldy load factors.

Even more important, it has recommended to the Government that the latter make available "gas only" rights in specific areas and in large blocks on a drilling performance basis as a direct means of speeding up the search for more gas. The Alberta Government is following this recommendation.

The Alberta board has not dismissed any of the applications—six in all—before it for export permits but has merely adjourned hearings on the applications until September 4, next.

The hearings will be reopened prior to that time in the event one or more of the applicants believes that it can present further evidence to support its application.

As further evidence of its co-operative intent the board has indicated that it might be willing to consider recommending the granting of an export permit—with provision for smaller domestic reserves than has been stipulated to date—if the increased tempo of drilling activity now in prospect succeeds in speeding up the discovery of new underground supplies.

The Alberta Petroleum and Natural Gas Conservation Board's conclusions and recommendations were as follows:

Conclusions and Recommendations

1. On the basis of present evidence and the board's consideration thereof, the board finds the present established reserves of gas as at January 1, 1951 to be:

	Within Economic Reach, MMMcf	Beyond Economic Reach, MMMcf
Reserved for local use	382	
General use (including the two major utility systems)	4,057	219
Total	4,439	219

2. The board concurs in the unanimous evidence of geologists and others to the effect that the vast sedimentary deposits underlying the Province offer great possibilities for the development of gas reserves.

3. The board has no doubt that the development of gas reserves has been hindered by lack of incentive caused by:

(a) Provincial Government restrictions on export.

(b) the lack of a large internal market.

Wide World Photos

Ernest C. Manning
Premier of Alberta

4. The board believes that while the present system of disposing of Crown lands and the establishment of Crown reserves is fair and equitable in so far as oil development is concerned, it is not well suited for gas exploration and development where larger blocks of land are necessary in order to make development of reserves attractive. It recommends that the Government favorably consider making "gas only" rights in specific zones available for exploration and lease in large blocks on a drilling performance basis.

5. In view of the most favorable prospects of the Province for the discovery of additional extensive gas reserves and in view of the possibility of the development of alternate forms of fuel and energy, the board believes that the Province will be adequately protected if sufficient reserves of pipe line gas are provided to maintain the supply and deliverability for thirty years.

6. The board does not believe the best interests of the Province as a whole would be served by requiring more than thirty years protection since this would have a continuing stifling effect upon the development of the gas and related industries.

7. The board estimates the Province's requirements for the thirty year period 1951-1980 as 3,059.9 billion cu. ft. made up as follows:

Domestic MMMcf	Commercial MMMcf	Industrial MMMcf	TOTAL MMMcf
873.7	751.7	1,434.5	3,059.9

8. The board considers that in order to meet the deliverability of the afore-

(Continued on page 46)

Natural Gas Dehydration Is Robotized In 15 Solid Desiccant Type Plants

by C. B. Ames

Vice-president, Fish Constructors, Inc., Houston

THE importance of natural gas dehydration prior to its transmission in pipe lines is today well recognized. Major reasons given for this process of water removal include: (1) prevents freezing or the formation of hydrates, which can block the line; (2) minimizes corrosion in the lines and other operating equipment in contact with the gas; and (3) eliminates the purchase of unsalable water vapors and reduces the horsepower requirements to move gas through the line, resulting in higher operating efficiency.

The Transcontinental Gas Pipe Line Corp. system will transport a portion of 585 million cu. ft. per day of dehydrated natural gas in its 30-inch, 1,800-mile-long pipe line from the Rio Grande Valley to New York City. To meet this demand, Fish Constructors, Inc., is erecting near the gas fields 15 plants designed to dehydrate the gas to a dew point of 25° F.* These units are of the solid desiccant type, employing florite, and are all identical in design and instrumentation —varying only in size to provide capacities which range from five to 30 million cu. ft. per day.

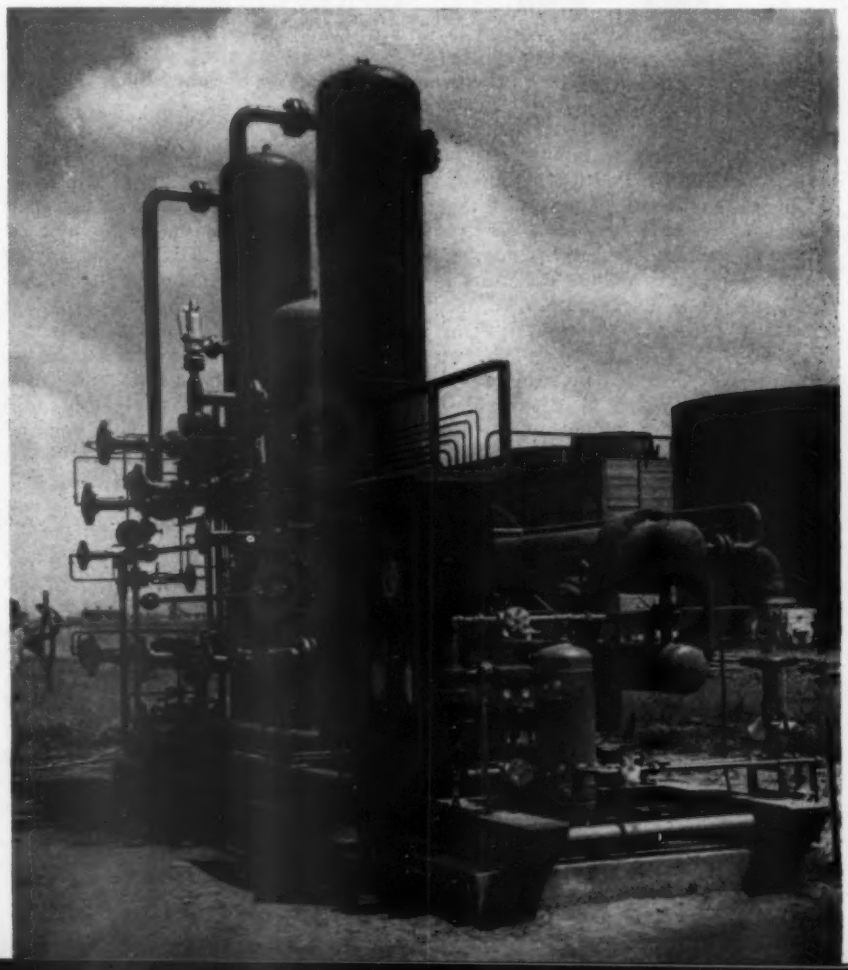
Operation of the plans is basically cyclic in nature with two towers or *contactors* being used alternately. One tower is kept on stream until its bed of florite desiccant is saturated; then it is switched off to be regenerated while the second tower is simultaneously placed on stream. In the switching process, involving 12 on-off type diaphragm motor valves, the need for reliable automatic control to supplant manual operation is paramount. In addition, temperature and flow must be constantly regulated in the system, if uniformly dried gas of the proper specifications is to be obtained.

Shown in the accompanying photograph and schematic diagram, essential components of the dehydration plant comprise: (1) *two contactors* which range in diameter from two to four feet and in height from 12 to 16½ feet, depending on the plant capacity; (2) a *gas-fired heater* for regenerating gas; and (3) a *regeneration gas cooler* where dehydrated gas is heat exchanged with gas from the tower under regeneration. Not shown on the diagram are two additional units of the plant, namely: an *inlet separator* which removes oil and entrained solids from the incoming wet gas, and a *water separator* which removes moisture accumulating from the regenerating gas.

The process basically involves a 16-hour operating cycle with each contactor on stream for eight hours, while the other is being regenerated for four hours and cooled for four hours. Regeneration is accomplished by a stream of natural gas by-passed off the main line of wet gas and heated to 350° F prior to its passage through the desiccant bed in the contactor. All equipment is operated under a pressure of 800 psi.

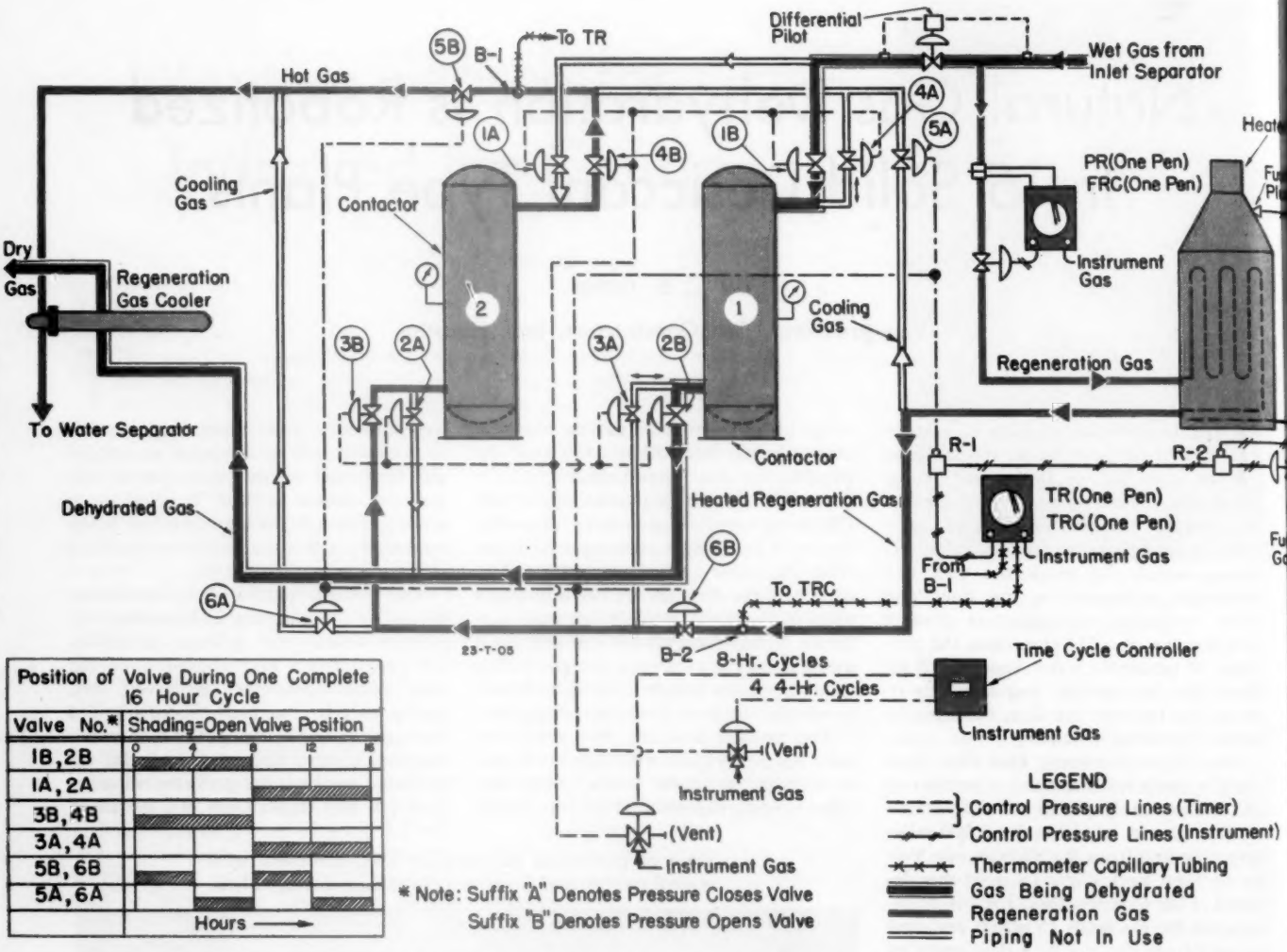
One general feature of the instrument system is its complete independence of outside sources for power. All clocks for chart drives and operation of the time cycle controller are seven day, spring driven. Pneumatic controls and fuel gas for the heater in the system are supplied from a line tapped off the dehydrated gas line, the pressure being reduced in two stages from 800 psi to 25

View of packaged dehydration unit, complete with control cubicle and numerous diaphragm motor valves.



* Equivalent to 6 pounds of water per million cu. ft. of gas at 800 psi pressure.

From "Instrumentation," published by Minneapolis-Honeywell Regulator Co., Industrial Division.



Position of Valve During One Complete 16 Hour Cycle

Valve No.*	Shading=Open Valve Position (0, 4, 8, 12, 16 — Hours)
1B, 2B	
1A, 2A	
3B, 4B	
3A, 4A	
5B, 6B	
5A, 6A	

Schematic flow diagram of dehydration system and controls.

psi by means of conventional pressure-reducing valves.

Operating sequence of the on-off type diaphragm motor valves which serve to switch contactors (coded by number-letter combinations on the diagram) is monitored by a time cycle controller through two control manifold systems, as shown. This instrument contains two poppet valves operated by cams which are rotated by means of a seven-day, spring-driven clock. Connected to the diaphragm motors of separate three-way valves, output gas pressure from the cycle controller is either applied or bled through these poppet valves—thereby governing whether full 25 psi gas pressure or zero pressure is maintained in each of the manifold lines to the diaphragm motor valves.

To follow the cycle of operation in detail, it will be assumed that No. 1 contactor is on stream. Main flow of gas is down through valve *1B*, into No. 1 contactor, and out the bottom through valve *2B*. Thence, the dehydrated gas flows out of the system, passing through the regeneration gas cooler. This flow continues for eight hours.

No. 2 contactor is cut off from the main gas stream by valves *1A* and *2A* which are closed. To provide heated natural gas for regeneration of this unit, some 10 per cent of the main gas stream is diverted by means of a diaphragm motor valve installed in the main gas stream. This valve is positioned by a "differential pilot" which operates from pressure taps downstream on the main flow line and upstream at the inlet separator; sufficient back pressure is thereby created to provide the by-pass flow of gas for regeneration.

As shown on the diagram, regenerating gas is flow controlled by a Brown mechanical meter (*FRC*) through a diaphragm motor valve; the meter also incorporates a pressure spiral and second recording pen for logging the system pressure of about 800 psi. The gas passes through coils in the heater, and then branches into two flow lines: up toward valve *5A* and down toward valve *6B*. For the first four hours, however, valve *5A* is closed, so that flow is only in the lower line through valve *6B*, which is open during this same period.

Further, as seen from the chart of valve positions, valve *6A* in the lower line is closed, thereby diverting the heated gas up through No. 2 contactor via valve *3B* on the bottom inlet line. The latter valve, as well as the valve *4B* on the top outlet line of the contactor, is open for the full eight-hour period; and during the first four hours permits the flow of heated regenerating gas up through the contactor bed. Moisture laden hot gas passes out through valve *5B*, being cooled by heat exchange with dehydrated gas in the regeneration gas cooler, as shown.

During the second half of the eight-hour period, the dried bed of No. 2 contactor is cooled by the flow of *unheated* regenerating gas which passes up through valve *5A*, down through the contactor via valves *4B* and *3B*, and thence through valve *6A* on out of the system to the gas cooler. This operation is initiated by the time cycle controller

which closes the fuel gas line to the heater, as described below, and cuts off the 25 psi gas supply from one manifold line to reverse the positions of the appropriate diaphragm motor valves (see diagram).

A mercury-filled type Brown thermometer (*TR-TRC*), range 0° to 500° F, serves to record and control temperature of the regenerating gas, as well as to record on the same chart, temperature of the moisture laden gas leaving the tower. The latter temperature is measured by a stainless steel bulb, *B-1*, inserted in the common line from the two contactors, as shown on the diagram. As hot gas dries out the desiccant, this bulb serves to record the gradual temperature rise and final leveling off when the bed is dry from top to bottom. Thus, it will indicate the drying rate which can be adjusted by changes in the set point of flow controller *FRC*.

For temperature control of the regenerating gas, a second bulb *B-2* is located in the heater outlet line ahead of valve *6B*, as shown. A narrow band proportional control unit in the Brown recorder throttles control gas which normally passes directly to the fuel gas control valve through pneumatic relays *R-1* and *R-2* (Honeywell type R048A). In accordance with the temperature set point of *TRC*, the fuel valve is thus positioned to maintain a constant temperature of regenerating gas.

Pneumatic relay *R-1* serves to cut off control gas from *TRC* and thereby close the fuel gas valve at the end of the four-hour regeneration period. This is accomplished by connection of the relay pilot in the impulse line from the time cycle controller, as shown. Pneumatic relay *R-2* also serves to cut off control gas from *TRC* through the action of a fusible plug which is installed to melt at 1,100° to 1,125° F, thus venting instrument gas pressure in the event of excessive heater stack temperature.

Battery of dehydration units.

'50 Years Is the Beginning' Says Central Hudson on Anniversary

CENTRAL Hudson Gas and Electric Corp., of Poughkeepsie, N. Y., has recently published an illustrated booklet, entitled, "50 Years Is the Beginning," to mark the anniversary of its founding.

The booklet contains the story of Central Hudson's role in the development of the community it serves. It traces the history of the community and the company decade by decade through the past 50 years.

In 1900 more than 60 companies were serving the central Hudson valley. At that time two smaller companies serving Newburgh, N. Y., consolidated to form The Newburgh Light, Heat and Power Co., under the leadership of William R. Beal.

During the first decade, control of Poughkeepsie Light, Heat and Power Co. was acquired by the Beal and the John L. Wilkie interests, and the Marlboro electric plant was purchased by Newburgh. Later the electric company at Cornwall was taken over and operated as the Hudson Counties Gas and Electric Co.

At the beginning of the next decade the Newburgh, Poughkeepsie, and Cornwall companies consolidated to form the Central Hudson Gas and Electric Co. In 1919 the United Hudson Electric Co. was formed as a subsidiary of Central Hudson, and it purchased companies at Kingston and Catskill. In 1926 the system of companies was consolidated into the Central Hudson Gas and Electric Corp.

The last two decades showed a steady growth for the company in spite of wars and depression. Manufactured gas sales have not increased as rapidly as electric sales over the past twenty years, but the increase is 94 per cent since 1929. With the advent of natural gas in 1950, forecasts indicate that 1953 gas sales will increase approximately 60 per cent over 1949.

The Booklet says:

"Over the past fifty years, the leadership of five principal officers of the company and its predecessors has been instrumental in the expansion of the business to its present size and territorial coverage—William R. Beal, the founder; Thaddeus R. Beal, successor to his father in the presidency, and John L. Wilkie, vice-president and legal counsel, who working closely together were responsible for the development of the company for over thirty years; Ernest R. Acker, present President and grandson of the founder; and John Wilkie, present vice-president and treasurer of the company, son of John L. Wilkie."

Voluntary Protection of Technical Information

SECRETARY *of Commerce Charles Sawyer has provided a service to help the public guard voluntarily against the harmful release of technical information, even though it is not subject to formal security restrictions.*

The Office of Technical Services of the United States Department of Commerce will receive requests for advice as to whether specific technical data should be disclosed, withheld, or given limited distribution. OTS will obtain expert opinions from the interested departments and agencies of the government and inform the inquirer accordingly.

As an industrialist, businessman, scientist, public official, or private citizen, you are invited to use this service whenever you question whether technical information in your possession should be disclosed. It is then entirely up to you whether or not you act on the government's advice. There is absolutely no compulsion for you to do so, since the program is entirely a voluntary one.

Requests for advice concerning the release of technical information, together with pertinent manuscripts, plans, or documents, if they are available, should be addressed to:

Office of Technical Services
U. S. Department of Commerce
Washington 25, D. C.

Your enclosures will be returned with the government's comment as promptly as compatible with the problems of fact and judgment involved.

Before inquiries are submitted, the information in question should be considered in the light of the types of technical data and the circumstances with which the program of voluntary protection are concerned.

Philadelphia Gas Works Now Repairs Refrigerator Units

The old unit is completely stripped down.

Each unit is given an internal and external steam bath.

A welding job is necessary to prepare the unit for the high-pressure air test.

THE Philadelphia Gas Works Co. scored another "first" in the annals of the American gas industry with the opening of the customers service department's refrigerator unit repair shop last March. Nowhere else in the United States, except at Evansville, Ind., where Servel gas refrigerators are made, was there a shop authorized and equipped to completely rebuild gas-freezing units.

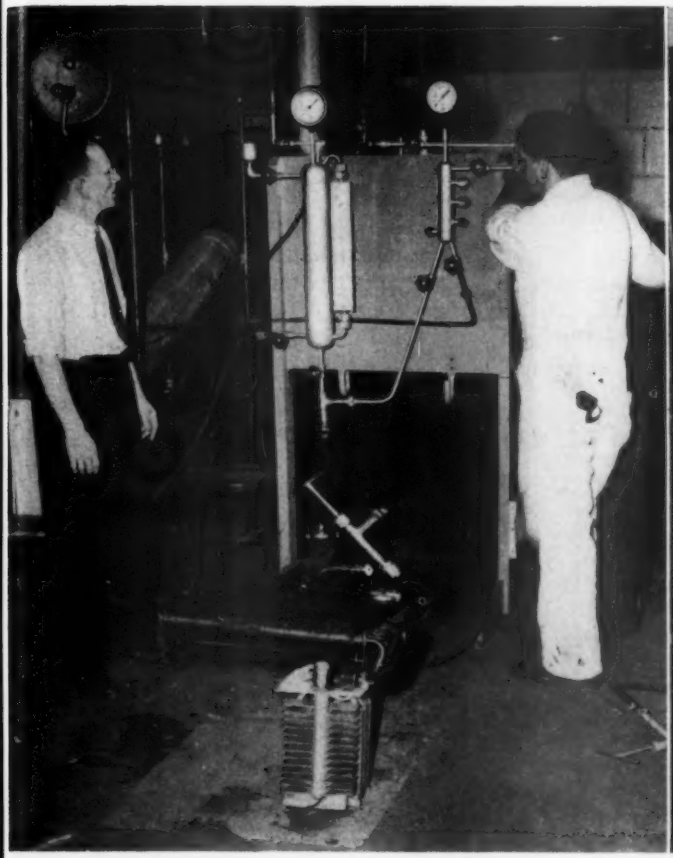
Actually, this is a "pilot plant" where Servel, Inc., is studying the economics of field repair versus factory repair. A study is also being made of all factors involved, including quality of work done, etc.

Results at the Philadelphia installation have been satisfactory enough to widen the experiment to include a similar installation, under Servel auspices, in New York to care for the northeastern area, and one in Los Angeles to care for the Pacific Coast territory. There is also an installation in operation by Servel in Hawaii.

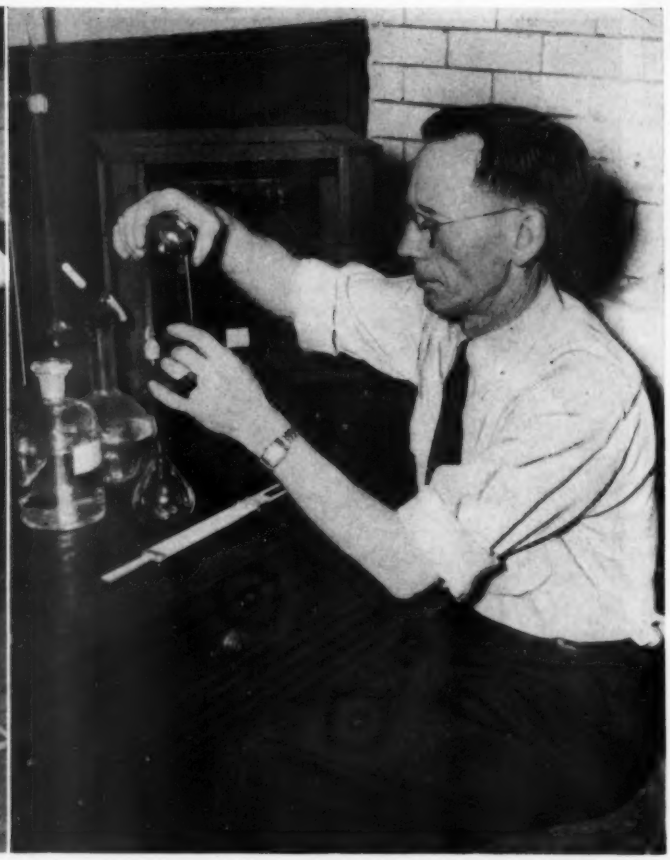
Officially designated as a Refrigerator Unit Repair Shop, the new quarters opened for business on March 1, 1950. The purpose behind this addition to PGW's rapidly growing facilities is twofold. First, to expedite service to customers, and second, to provide replacement units at lower cost. Instead of sending freezing units back to Evansville for rebuilding, all necessary mechanical work in this connection is being done in Philadelphia, thus saving time and expense.

All Philadelphia knows that the Servel gas refrigerator is the only refrigerator with the 10-year unconditionally guaranteed freezing unit. Why, then, a Unit Repair Shop? The answer is simple enough. The basic fundamentals of the gas refrigerator's freezing unit have not changed materially since its introduction to the public back in the late 1920's under the name of Electrolux. Many of them installed in the early days of automatic refrigeration are still in use.

Despite the long operation of many old gas refrigerators, along with the expiration of the warranty, homeowners



Here the unit is charged with refrigerant.



Clayton Smith, foreman, analyzes the ammonia solution.

Illustrations—by courtesy of Philadelphia *Gas Works News*

Above: new parts are tack-welded to the unit.

Right: the units are put in a 350° drying oven.

Above: units are assembled for final operation.

Right: the final repair step is spray-painting.

usually prefer to get the maximum service from their long-used refrigerators. Rather than buy a new Servel when "old-age" troubles develop in the freezing unit, most customers elect to have a replacement unit installed. Thus, at comparatively small cost, if the warranty has expired, old refrigerators are restored to give the same fine service as the day they were bought. If the customer has continued to cover his refrigerator by a warranty extension service contract, it protects him against any expense for unit replacement, and for replacement of other operating parts, also regardless of age.

Up to this time, all units sent into the newly established RURS have been more than 10 years old and most of them are much older. The relatively few freezing units in new Servels which fail to live up to expectations are covered by the manufacturer's warranty and are returned to the factory for replacement.

Operations in the RURS began on a modest scale. While plans for this new shop had been under consideration for nearly two years, many months passed before the go-ahead signal had been given. Then, a group of customers service workmen were trained especially for this work, since every operation was new to the men.

With the assistance of several Servel engineers, the transition from storage space to workshop was supervised by CSD's Michael Belensky. Occupying about 8,000 square feet of floor space, the shop has been designed to provide facilities for a smooth flow of operations.

Here's how it works. A unit sent in for rebuilding passes through a series of assembly line stages as it progresses toward final completion. For example, a unit is first discharged of refrigerant and disassembled. Then follows a steam washout, both internal and external; a trip to the drying oven, several stages of welding, several leak tests, recharging with refrigerant, unit re-assembly, final testing for proper performance, spraying, and thence to the stock room, ready to go back into service as good as new. A well-stocked store room is located in a far corner of the shop where a supply of parts, used in the rebuilding process, is maintained.

Clayton D. Smith, who has worked on gas refrigeration ever since it came into prominence in the late 1920's, supervises the work of the new shop. As time goes on and the anticipated increase in operation develops, the eight man force will be augmented to meet conditions. For the time being, however, the present force is adequate.

El Paso Proposes to Expand By 400 Million Cu. Ft.

El Paso Natural Gas Co. has filed an application with the Federal Power Commission proposing an $83,000,000 construction program designed to increase capacity of the company's pipe line system by 400 million cu. ft. of natural gas per day.

El Paso proposes to deliver 150 million cu. ft. of the additional gas jointly to Southern California Gas Co. and Southern Counties Gas Co. of California; 150 million cu. ft. to Pacific Gas & Electric Co.; and 100 million cu. ft. to other customers located on the El Paso system in Arizona, New Mexico and Texas.

The proposed project includes construction of 93 miles of 26 and 30-inch loop on sections of El Paso's transmission line extending from the Permian Basin in southeastern New Mexico and western Texas to the Arizona-California state line; 180,850 hp. in new and existing main line compressor stations; approximately 311 miles of line in El Paso's field transmission system; 42,370 hp. in new and existing field compressor stations; purification and dehydration facilities; field gathering facilities; and seven amine recovering plants.

El Paso plans to complete the facilities for Arizona, New Mexico and Texas by October 1, 1951, and to complete the facilities for California by November 1, 1952.

European Gas Economy Is Moving Toward Self Sufficient Basis

An Interview with Virgil Stark

President, North American Utility and Construction Corp.

Virgil Stark

IMPORTANT new trends in the gas production situation in Europe were outlined by Virgil Stark, President of North American Utility and Construction Corp. and North American Petroleum Gas Corp., in an exclusive interview with AMERICAN GAS JOURNAL. Mr. Stark recently returned from an extended tour of western and southern Europe. He revealed that his companies now have contracts to supply gas equipment for about 70 gas plants and propane installations, principally in Italy and France.

In Europe gas is now produced largely by distillation of coal. The production cost is high, especially in the smaller plants. Gas rates are kept low for political reasons and the governments, in order to keep the gas properties alive, partially subsidize coal purchases, and allow high prices for the main by-product, which is coke. The heat content of gas was lowered to 370 Btu per cu. ft. in Italy, Mr. Stark pointed out, but there is now a noticeable trend to change this situation and to find new solutions without the necessity of government subsidies.

In France the rates for gas were substantially raised during the middle and latter part of 1950, increases varying from 50 to 80 per cent. The heat content of the gas was increased from 370 to 440 Btu per cu. ft. Pipe lines inter-connecting cities are being built which will tend to eliminate small plants. In other countries, like Italy, a limited rate increase was allowed and the price of coke was lowered.

The gas plant equipment is old in many instances and needs replacement. Increased capacities must be made available for peaks and for additional load requirements. In France gas consumption increased 65 million Mcf in 1938 to 95 million Mcf in 1949, with only minor increases in gas plant capacities.

On the other hand, Mr. Stark said, new types of fuels are becoming available in the European market which tend to replace coal as the only fuel for gas production. These fuels are natural gas, heavy oil and propane.

Natural gas has been found mostly in southwestern France and northern Italy. Some interest is shown in using the "*grisou gas*," which is mostly methane from coal mines in Belgium and northern France. The output of natural gas in southwest France was 1,000,000 cu. ft. per day in 1942, and 25,000,000 cu. ft. per day in 1949. Reserves are figured at 220 billion cu. ft.

In Italy AGIP is the largest natural gas supplier and expects to distribute approximately 200,000,000 cu. ft. per day, which is about five times the 1950 production of 40,000,000. AGIP has ordered from Mr. Stark's company a gasoline extraction plant with a capacity of 100 million cu. ft. per day of natural gas.

Installing Cottrell tar precipitator at the gas works in Florence, Italy.

This will be the largest plant in Europe.

Both in Italy and in France natural gas is piped to important cities. The practice of gas utilities in large cities is to reform the natural gas to a Btu content near the present manufactured product, and eventually to mix natural gas with the present coal gas. This solution is expected to eliminate the necessity of adjusting appliances, the danger of larger "unaccounted for" and the necessity for rate changes because of the higher Btu content of the natural gas. American equipment has been bought for reforming natural gas in catalytic generators and in carbureted water gas sets.

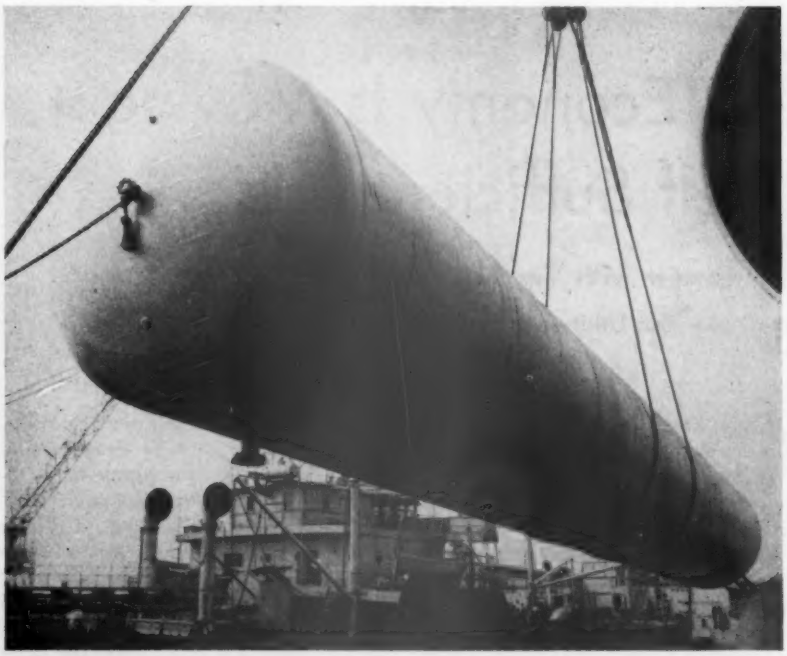
In smaller towns and industries natural gas will not be reformed. However, the price charged for natural gas is presently high. It is approximately 80 cents per Mcf in Italy and about $1 per Mcf in France which is more than double the cost in the United States.

Heavy oil may present an interesting situation for the European gas plants. The capacity of the oil refineries in Europe will be increased from 37.9 million tons in 1938 to 62.4 million tons in 1953.

The crude oil production in Europe is only 7.7 million tons per year. Most crude oil is now imported from the Middle East which produced, in 1949, 68.4 million tons per year and has a refinery capacity of only 43 million tons, so that Europe will refine a good part of the Middle East oil. Mr. Stark added that it is interesting to note that the USSR has a production of 33.2 million tons per year (seven per cent of the world production).

The heavy oil obtained in the refineries represents approximately 20 per cent of the quantity of crude oil refined. This means that approximately 12 million tons per year of heavy fuel oil will be available in Europe. The sales market is limited. In France, during 1938, 42 per cent of the heavy oil was used by the navy.

Heavy oil costs approximately eight cents per gallon in France and 10 cents



Anchors Aweigh—This picture shows how propane tanks were loaded aboard the SS Paolina last October. Six tanks—103" id by 70'-10"—were shipped abroad on this voyage.

per gallon in Italy, which is a much higher price than in the United States. However these prices are lower than the price of coal per unit of heat content and considering other costs (labor, etc.) for producing gas out of coal, the production cost of oil gas can be more than 30 per cent lower.

Oil can be used either as the only fuel in oil gas generators or with coke in carbureted water gas sets. The oil gas is of high heat content (approximately 1000 Btu per cu. ft.). It can be used as such for reserves or peak loads for natural gas distribution or for changeover distribution. It can also be reformed to a lower heat content gas to be mixed eventually with coal gas. Special consideration has to be given to purification of oil gas since European oils have a higher sulphur content.

Propane has been used in the past only in few instances, with eight small towns in France consuming approximately 400,000 gallons per year. The expanded refinery capacities, the extraction of propane from natural gas will make larger quantities of LP gas available in many countries, among them being, France, England, Italy, Holland, and Belgium.

The LP gas produced from oil refineries represents approximately one per cent of the crude oil quantities refined.

In France the production of LP gas in 1950 was approximately 50 million gallons, 80 per cent from refineries and 20 per cent from natural gas. This will increase to 80 million gallons per year, in Mr. Stark's opinion.

In 1950 Italy imported more than half of its requirements for bottled gas of 10 million gallons per year. By 1952 this nation will have a production of approximately 40 million gallons per year, of which 20 million will be produced from the gasoline extraction plant supplied by Mr. Stark's company. Holland produces approximately eight million gallons of propane per year.

The wholesale price of propane is approximately 14 cents per gallon in France and 20 cents per gallon in Italy, which is much higher than in the United States. These prices will probably be reduced as added supplies become available.

Most LP gas is now used for bottled gas distribution in 20 lb. bottles. There are presently about 1,000,000 accounts in France, and 500,000 accounts in Italy. Mr. Stark's company has supplied 36 storage and propane filling stations for Italy.

The changeover of small gas plants to propane air is an interesting solution for Europe. France has ordered equipment to change over 30 gas plants to propane. Even at 14 cents per gallon for propane gas production costs will be less than half of the present cost in small plants.

Propane is also considered for enriching and peak loads in larger plants and a number of installations are under way, supplied by Mr. Stark's company.

"Do or die becomes the question to be solved by many gas plants in Europe," Mr. Stark concluded. "New fuels available in Europe and the benefit of US experience gives promise of a successful solution of the European fuel problems."

PAR Expenditures in '51 to Be $1,700,000

THE Committee on Promotion, Advertising and Research (PAR) of the American Gas Association recently approved expenditures of nearly $1,700,000 for the gas industry's coordinated programs in these fields for 1951, Norman B. Bertolette, President, The Hartford Gas Co. and chairman of the PAR Committee, has announced. Funds for the PAR activities are voluntarily contributed by gas company members of AGA and the program is now in its seventh year. These association activities supplement and are in addition to the promotional, advertising and research activities of gas appliance manufacturers and gas utility companies.

A total of $657,000 was authorized for general research during the coming year. Allocation of these funds includes $140,800 for domestic gas research; $63,400 for industrial and commercial gas research; $371,800 for gas production research and $81,000 for general technical research. The gas research program will be carried out under the supervision of the AGA General Research Planning Committee, headed by L. E. Knowlton, executive vice-president, Providence Gas Co.

Frank C. Smith, President, Houston Natural Gas Corp., and chairman, AGA General Promotional Planning Committee, reported that approximately $1,014,000 has been allocated to carry out the promotional and advertising programs of the industry this year. This sum includes $825,000 for national advertising and industrial and commercial advertising, and about $189,000 for promotional activities.

Resale receipts from promotional material produced and sold to the gas industry at cost are estimated at $155,300 for 1951, making a total of about $345,000 that will be expended for general promotional activities integrated with the national advertising campaign and for special activities promoting a commercial kitchen program and the Association's New Freedom Gas Kitchen program.

It is estimated that about $660,000 will be spent for national advertising next year on domestic gas ranges, gas refrigerators, gas water heaters and gas clothes dryers. About $13,500 will be devoted to advertising in architectural and building publications and about $130,000 in business, trade and college publications, advertising commercial and industrial utilization of gas.

Incremental expenses for the execution of these programs are estimated at $27,500 for the year.

State Statute Is Necessary for Lien To Secure Payment for Gas

by Leo T. Parker

Attorney at Law, Cincinnati

A READER recently asked for information, concerning when and under what circumstances real estate is subject to a lien to secure payment for gas consumed on the property. This reader wanted to know specifically whether a city ordinance is valid and effective if it gives a lien on real property to compel the landlord to pay for gas consumed by tenants.

Leading higher court decisions clearly interpret the law on this subject.

When Lien Is Valid

First, it is important to know that while gas companies and municipalities are obligated to perform valid contracts to supply gas to consumers, neither a municipality nor a gas corporation can rely upon a city ordinance which gives the public utility a lien on real property to secure payment of delinquent gas bills. In other words, city ordinances of of this nature are *not* valid unless authorized by a state law.

The higher courts have consistently held, for example, that a regulation of a gas company, not authorized by a state statute and which required property owners to pay for gas, is unenforceable. (153 N. Y. 435) Hence without state law authority a property owner cannot be held liable for the gas bills of his tenant, although a city ordinance places this liability on the landlord. This is true because, broadly speaking, real property *cannot* be subjected to a lien for unpaid water bills unless a state authorizes the lien. (171 Mass. 329.)

On the other hand, a review of leading higher court decisions discloses that state laws *are* valid by which gas companies are given liens on real property to secure payment for gas consumed on the property. Moreover, such bills may or may not be incurred by tenants of the property owner. (163 N. E. 82.) This same law is applicable to electric, water and other public utility corporations.

It has been erroneously contended that city ordinances are valid on the pretense of "police powers" intended to safeguard the health of citizens. The Supreme Court of the United States has decided that a municipality cannot pass a valid ordinance to compel property owners to pay electric, gas, water, or like bills incurred by tenants, unless a state law clearly authorizes the ordinance.

For illustration, in a leading case, White, 188 U.S. 45, it was argued that a city ordinance is valid which requires landlords to pay bills for electric, gas, and water used by tenants. The argument was based upon the fact that cutting off such supply for non-payment of bills may cause injury to the tenant's health and, therefore, landlords should be compelled to pay delinquent bills to protect the health of their tenants, and at the same time assure payment to the public utility. However, the United States Supreme Court said:

"The claim of the police power would be a mere pretext, become another and delusive name for the supreme sovereignty of the state to be exercised free from constitutional restraint . . ."

For comparison, see Vanderbilt, 160 Atl. 825. Here the owner of real property mortgaged it. Later the holder of the mortgage foreclosed and took possession of the property. A public utility company refused to supply services to the new owner unless he paid the bill owed by the original owner and mortgagor of the property.

Since no state law existed which authorized public utility companies to hold a valid lien on real property to secure payment of "over due" bills, the higher court held the company bound to supply services to the new owner, and said:

"It is stipulated by the parties that there is no statute rule or regulation in this state under which defendant (public utility company) is entitled to a lien on premises for arrears. . . . In that situation defendant may not refuse to supply its services to a new owner or tenant of the premises. . . ."

Thus, without going into further and greater detail, it is quite clear that higher court decisions at hand which hold that ordinances and regulations which give liens on real property to secure payment of all delinquent bills for all services rendered to occupants of the property are void, *unless* such ordinance or regulation is fully and clearly authorized by a valid state law.

A further review of higher court cases discloses that a gas corporation which is authorized by a valid state statute to shut off gas from premises whose occupants fail to pay for consumed gas cannot be compelled to supply gas (1) to premises purchased from a former owner who failed to pay a bill for gas supplied to the premises; (2) or to premises on which a former tenant failed to pay for gas; (3) or to a presently insolvent firm which failed to pay a just gas bill.

'Preferred Creditor'

Recently a higher court held that a city or public utility corporation is a "preferred creditor" where the testimony shows an insolvent property owner failed to pay for public utility service used on the premises.

For example, in McCormacks v. City of Tacoma, 15 P. (2d) 688, a state law was litigated which provides that public utility corporations are granted a lien for delinquent and unpaid charges for services against the premises and real property to which the services have been furnished. The law provides further that the lien may be enforced by cutting off services against the premises to which the same has been furnished, after the charges become delinquent and unpaid.

A property owner who failed to pay his bill for services became insolvent.

In subsequent litigation the higher court held that the public utility corporation had a "preferred" claim, thereby insuring first payment from the assets of the property owner. The court said:

"The remedy runs against the premises served, as well as against the tenant using the water."

In another leading case, East Grand Forks v. Luck, 97 Min. 373, a higher court upheld the validity of a state law which makes an owner of real property personally liable for services furnished to a tenant on the property. This court held that the law is *not* unconstitutional

although it compels the property owner to pay the debt of another. This is so although it was contended that such a law violates the state and United States Constitutions.

This court held:

"Such provision does not, in our judgment, which provides that a person shall pay the debts of another, thus take his property without due process of law. The theory is that the obligation on the part of the (property) owner rests upon contract, which is implied by the fact that he connects his premises to the . . . system."

Law Must Be Definite

According to a recent higher court a state law *intended* to give valid liens on real property for unpaid gas used on the property is *not* valid and effective, if such law is in any sense ambiguous.

For instance, in the leading case of Home Corp., 290 N. W. 888, it was disclosed that a state law provides that each city *may* in its charter provide "for the exercise of all municipal powers" whether such powers be expressly enumerated or not and to pass all laws and ordinances relating to its municipal concerns.

In other words, this law was intended to give municipalities which operate water, electric, gas, and like plants a broad authority to enact ordinances to assist in collection of bills for these commodities and services. The same legal effect and situation would exist had the law simply stated that municipalities may pass ordinances to assure that public utility corporations may collect for services rendered.

Under this broad law the city adopted a charter which authorized the city to have liens on real property to secure payment of delinquent bills.

Subsequently the validity of this law was contested on the grounds that there is no express provision in the state law which clearly authorizes a lien on real property to secure payment of delinquent bills for services rendered by public utility corporations.

It is interesting to observe that the higher court decided that this state law is ambiguous and that the municipality could not have valid liens on real property to secure payment for rendered services. This court explained that the state law must be revised to specifically authorize municipalities to enact ordinances giving liens on real property to secure payment of all delinquent bills; otherwise the city has no such power.

Considerable discussion has arisen from time to time over the legal question: Is a state law valid which give liens on real property for unpaid gas bills? The answer is *yes*.

For example, in Whitefield Village v. Bobst, 39 Atl. (2d) 566, a state lien law was before the higher court for interpretation. This law provides: "All charges for gas furnished to patrons in any city, town or precinct . . . shall become a lien upon any real estate where such gas is furnished, and said lien shall continue for one year from the last item charged in said gas rates . . ."

Gas was supplied to the owner of real property who later sold the premises and buildings thereon and gave a deed for the property to the new purchaser. The new purchaser of the property borrowed money from a bank, used it to pay the seller and gave the bank a mortgage to secure the loan. In the meantime several occupants of the buildings incurred delinquent gas bills.

In subsequent litigation the court held: A law of this kind gives a lien on the property for the rendered services; second, the city is entitled to a *first* lien on the property for services rendered before the building was mortgaged; third, the lien did not take priority over a mortgage recorded *before* the services were rendered; fourth, the lien is prior to a mortgage recorded *after* the services were rendered; and fifth, it is immaterial and not important who uses services for which the bill was not paid.

Hence, this court clearly indicated that a state lien law is valid which *clearly* specifies that gas corporations shall have *first* liens on real property for *all* gas consumed on such property.

Reasonable Regulations

Modern higher courts consistently hold that a gas corporation may without *any* liability cut off gas supply for failure of a consumer to abide by reasonable rules and regulations. For example, various higher courts have held that gas companies have a right to adopt and enforce reasonable rules and regulations for their security and convenience, and enforce the consumers' compliance therewith by refusing to render service or discontinuing the present service.

Hence, either a municipality or gas corporation furnishing gas may make reasonable rules and regulations to insure the payments of bills. Such regulations are reasonable and valid which authorize stopping the supply unless all arrearages are paid. In fact, a leading higher court held that a state law is void by which a gas company is prohibited from cutting off a delinquent consumer's supply of gas until the amount of his deposit with the gas company has been used up. See Hewsey v. Queens Borough Gas & Electric Company, 93 N.Y.S. 114.

Another important point of law is that a gas company which *legally* and *lawfully* cuts off a gas supply is not liable for the resultant injuries to any person on the premises. See Young, 116 Fed. (2d) 720. Here it was shown that gas was being furnished to a building under a contract with a person named Lamb, and that this account had been repeatedly delinquent. On December 1 the bill was delinquent. By special arrangements the service was continued until the 22nd, on which date the bill not having been paid, the gas was cut off. Gas service was restored on an oral guarantee that the bill would be paid by the 24th. The bill was not so paid and service was discontinued on the 28th on which date a woman named Young was made ill because the weather was extremely cold and no heat was available in the building after the gas was cut off.

Young sued the gas company for heavy damages on the contention that the gas bill was not delinquent due to her neglect or fault and further that the gas company was legally obligated to notify her before cutting off the gas supply and subjecting her to exposure to the extreme cold.

The lower court considered all testimony and decided that Young was confined to her bed and was then under the care of a practical nurse; that the gas company was serving the house where Young was living and the gas company's officials were advised by her nurse of her condition, and yet turned the gas off; and that the act of the gas company through its agents and servants in cutting off the gas proximately caused Young to suffer added sickness and pain and a serious and permanent bronchial condition.

The lower court held that the gas company was guilty of *abuse* of any legal right it may have had under ordinary circumstances to discontinue service of gas to the house in which Young lived, and that the gas company was liable in heavy damages to Young.

The counsel for the gas company appealed to the higher court which held the gas company *not* liable. The court said:

"The penalties for withholding relief from the suffering or for failure to respond to the call of worthy charity are not to be found in the laws of men, but only in that higher law, the violation of which is condemned by the voice of conscience."

No Negligence

It is seldom that a gas company will be held for failure to supply gas or furnish service through accident, where no negligence is evident.

Assume, for example, that a consumer applies to a gas company for service and the consumer suffered financial losses because the gas company failed to connect the gas supply. In order that the consumer shall receive a favorable verdict it must be proved that the company

(Continued on page 44)

Gas Leak Detection Practices

by Frank P. Mueller

The Peoples Gas Light and Coke Co., Chicago, Ill.

THE detection and location of combustible gas leaks is a subject of vital concern to all companies engaged in the manufacture and/or distribution of gas. Leakage of gas into confined or even for that matter into unconfined areas constitutes a hazard to human life and property.

The gas industry might well be proud of the enviable safety record that it has made for itself in the distribution of its commodity. While gas consumption has steadily grown in the United States during the past twenty years or more, the number of so-called "unfriendly" fires due to gas is very low. As a matter of fact of all of the factors contributing to and responsible for such fires gas is virtually at the very bottom of the list. Certainly this is a fine tribute to the thought and care that has gone into the operation of an industry that supplies the nation with an increasingly important part of its thermal demands.

Transmission of natural gas through large diameter pipe under high pressure and over long distance calls for constant vigilance if gas leaks are to be kept at a minimum. The same can be said for the distribution of manufactured gas which, while under relatively lower transmission pressures, nevertheless traverses a veritable maze of mains and services before reaching points of consumption. The gas leak component of unaccounted for gas must always be regarded as something more than a factor affecting the economics of operation—it must be considered as a reflection of the safety of a company's entire distribution system—a measure of the quality of the operating practices and policies of the organization.

Detecting Gas Leaks—Historical

The need and importance of determining the presence or absence of flammable gases in the atmosphere was recognized at least 250 years ago in coal mining operations. As early as 1700 attempts were made in England to test for the presence of fire damp (methane) in coal mines by lowering a dog into the shaft and observing his reactions. It is reported that the dog would howl upon reaching the level where fire damp was present. Oddly enough as primitive as this method seems to have been, dogs are being used today in the supervised patrolling of natural gas transmission lines in checking for gas leaks.

S. S. Tompkins in his very comprehensive and excellent paper titled "Gas Detection Instruments" presented before the American Gas Association Technical Section in 1932, traces the early development of gas leak detecting practices and devices in this country. It is reported that in the early days of coal mining, open flames were used for judging the general nature of mine atmospheres, the burning characteristics of the flame being an indication of the presence or absence of flammable gases.

In 1813 Dr. W. R. Clanny designed one of the first closed safety lamps. This was followed about two years later by the Stephenson lamp and the Sir Humphrey Davy lamp.

Liveing in 1878 devised an instrument embodying the principle that a platinum wire heated by electricity glows more brilliantly in contact with a combustible gas than when in contact with air. The brightness of the wire indicated the amount of combustible gas present. Martienssen's detector used in more recent years operates on the general principle of the Liveing detector.

In 1883 Marsaut introduced a lamp having two gauzes and a bonnet, features which made for greater safety. These advancements are to be found in the modern Wolf and Koehler safety lamps.

In 1894 Tilghman was granted a U. S. patent covering a hot wire type combustible gas indicator, the basic idea of which is incorporated in many of the popular gas detecting devices today. Tilghman's indicator operated on the principle that burning a flammable gas on the surface of an electrically heated wire caused an increase in the temperature of the wire which resulted in an increase in electrical resistance and disturbed an electrical balance set up across a Wheatstone bridge. The instrument could be calibrated in terms of the lower and upper explosive limits of most hydrocarbons or flammable gases. Such instruments find rather wide application today in the examination of questionable atmospheres.

FIRE LOSSES—1947

	DOLLAR LOSS	PER CENT
1. Unknown	$208,000,000	29.6
2. Explosions	77,000,000	11.0
3. Defective Heating Equipment	56,000,000	8.0
4. Electrical Fixed Service	56,000,000	8.0
5. Smoking and Matches	51,500,000	7.3
6. Lamps, Lanterns, Oil Stoves	26,600,000	3.78
7. Exposure	24,900,000	3.54
8. Flammable Liquids	21,800,000	3.1
9. Lighting	20,400,000	2.9
10. Spontaneous Ignition	19,700,000	2.8
11. Sparks on Roof	19,500,000	2.77
12. Chimneys, Flues	16,900,000	2.4
13. Open Lights, Flames, Sparks	16,400,000	2.3
14. Electrical Appliances	12,300,000	1.7
15. Miscellaneous	11,900,000	1.69
16. Hot Ashes—Coals	11,400,000	1.6
17. Incendiary—Suspicious	10,800,000	1.5
18. Children and Matches	8,300,000	1.18
19. Rubbish	6,700,000	0.95
20. GAS AND APPLIANCES	5,900,000	0.84
21. Torches—Welding—Cutting	5,300,000	0.75
22. Sparks from Machinery	5,000,000	0.71
23. Grease—Tar—Etc.	4,700,000	0.67
24. Combustibles near Heaters	3,900,000	0.55

from National Fire Protection Ass'n.

Current Practices in Leak Detection

Practices to be followed and instruments to be used in looking for gas leaks and for the examination of questionable atmospheres are influenced by a number and a variety of factors. Such things as the nature and composition of the gas distributed, pumping pressures and distances, the nature of the geographical areas served with respect to population densities all have a bearing on the case. While it is true that there are certain rather generally accepted practices fol-

Presented at 1950 Production and Chemical Conference, Operating Section, AGA.

TABLE I—LEAK DETECTION—GENERAL METHOD

District	Kind of Comb. Gas Indicator Used	Dilutor Used?	Distance Between Test Holes	Where Drilled: No Pavement	Where Drilled: Pavement	Method of Drilling	Other Remarks
A	Davis	No	8 Ft.	Over Main	Parkway	Hand Bars	Vegetation survey is made twice each year.
B	Johnson-Williams Model C	Yes	30 Ft.	Over Main	Parkway	Air Hammers and Hand Bar	Bottling tests, Schulte Leak Detector, Stethoscope and vegetation surveys are also used.
	Davis No. 11-91	Yes				Also use ¼" steel rod which can be barred without hammer	
	Johnson-Williams Model F	No					
	Davis M-5	No					
	Davis 11-345	Yes					
C	MSA No. 2	Yes	10 Ft.	Over Main	Parkway	Air Hammer and Sledge	Vegetation survey each spring.
D	Johnson-Williams	Yes	10 Ft.			Air Hammer	Condition of vegetation is observed.
E	Johnson-Williams	No	20 Ft.	Over Main	Parkway	Sledge	
F	Davis No. 5	No	6-10 Ft.	Over Main	Over Main	Air Hammer	Conduits are plugged with soap to determine direction of source of gas.
G	Davis	No	20 Ft.	Over Main	Parkway		Condition of vegetation aids in locating possible leak location.

lowed throughout the industry today in this work, much remains to be done in the standarization of methods and in the instrumentation employed.

Whatever methods, practices, and policies are followed in looking for gas leaks or in the examination of confined atmospheres, gas having an odor, either inherently or as a result of artificial odorization, lends itself to greater ease in detection than relatively odorless gas. While resorting to the sense of smell is not to be considered as a completely reliable way to track down gas leaks, nevertheless an odorized gas escaping into a confined space will generally make its presence known before dangerous concentrations are reached.

In gas leak detection work it is essential to realize that danger may exist by reason of: 1. Toxicity to human life; 2. Explosive mixtures with air; 3. Deficiency of oxygen (about 17 per cent by volume is necessary to support human life).

W. R. Fraser states, "In gas company operations there are relatively few atmosphere contaminants that must be detected for the safe operation of properties or for the protection of personnel and the public in general." Fraser groups the materials that may cause (a) an oxygen deficiency or (b) a combustible or toxic condition as follows:

MATERIALS CONTAMINATING ATMOSPHERES TO CAUSE

OXYGEN DEFICIENCY	COMBUSTIBLE OR POISONOUS CONDITIONS
Nitrogen	Fuel Gases (Heavy & Light gravity)
Marsh Gas (High concentration)	Marsh Gas
Natural Gas (High concentration)	Gasoline or Naphtha Vapors
Carbon Dioxide	Hydrogen Sulphide
Etc.	Carbon Monoxide
	Hydrogen
	Cleaning Compounds Carbon Tetrachloride Trichloroethylene
	Refrigerant Gases

In setting up any general program to be followed in tracking down gas leaks many gas companies find it advisable to use several different types of instruments. Generally speaking, it is not only difficult but virtually impossible to locate as well as to identify flammable gases by means of any one single piece of test equipment.

In selecting instruments for gas leak detection, thought must be given to the kinds and compositions of gases apt to be encountered. Carbon monoxide detectors, for example, while invaluable in the manufactured gas plant will have little use in natural gas fields since natural gas does not normally contain carbon monoxide. Combustible gas indicators, on the other hand, while generally responsive to all flammable gases, should be used as indicating rather than identifying devices. A positive reading on such an instrument on a sewer atmosphere sample, for example, may be due to various things. In addition to the possibility of its being a gas leak it may be traceable to volatile liquid fuels and solvents such as gasoline and naphtha which quite frequently find their way into the sewer system. Conceivably it might even be due to methane generated by the putrefaction of the sewage. In any event a careful gas analysis is required before positive identification of the origin and composition of the flammable gas can be made. To be sure, combustible gas indicators are indispensable in looking for gas leaks, but identification of the gas should be made by means of a standard gas analysis apparatus.

In the effort to determine some of the practices and procedures followed by the gas industry today in checking for gas leaks members of the subcommittee on analyses and tests were asked to tell of their experiences along this line.

Company "A"

Company engaged in the transmission of natural gas under high pressure.

1. "Noting gas volume discrepancy reports.
2. "Observing vegetation along right of way—wheat fields are especially susceptible to gas leaks.
3. "When gas leaks are suspected in an area with no vegetation a probe bar is inserted above the main line at short intervals and samples of air from the probe holes are tested with a portable combustible gas indicator."

Note—If there is any question as to the origin of the gas leak, a sample of the escaping gas is taken for analysis. The composition of the gas indicates whether it originated from company's "A" pipe line or from some other source.

Company "B"

"The use of detectors is depended on entirely for the detection of and location of leaks in our underground piping—no reliance is placed on the sense of smell even though our gas is odorized. Leakage work is carried out by two groups; the first group designated as surveymen, test the atmosphere in all sub-structures, the basements of all major buildings, theaters, schools, hospitals, all places where public gatherings may occur and periodically check for combustible in services through bar holes at curb and building wall. The periodic checks depend upon the area history; some areas may be checked at six-month intervals while other areas may not be checked for 10-12 years.

The second group, designated as prospectors, investigate the area in which gas leakage has been reported to exist by the surveymen, by other utilities, by customer complaints, by service shops reports (all shop servicemen who answer leak complaints are equipped with detectors), or from any other source. The prospectors focalize the center of gas leakage area and locate the exact point at which the street department maintenance crews will excavate. The survey-

men are equipped with only a combustible gas detector. The prospectors are equipped with means for locating underground conduits (pipe locators and maps) standard combustible gas detectors, flow type combustible gas detectors, and power and manual equipment for making needle bar holes.

"Regulator and gate maintenance crews are equipped with Wolf lamps which are used to determine whether there is any combustible content in underground vaults and manholes before the covers are removed. If combustible is noted, the underground structures are not entered and maintenance crews are called to correct the condition.

"The laboratory handles all requests for atmosphere tests within the production plants as well as making a routine atmosphere survey once each month of production station buildings, gas equipments, sewer manholes, vaults, and trenches.

"The following makes of combustible gas detectors are used:

Mine Safety Appliance	Box type
Mine Safety Appliance	Belt type
Johnson-Williams	Box type
Heiland	Flow type
Wolf Safety Lamp"	

Company "C"

An institution engaged in scientific research.

This organization suggests the use of the Haldane modification of the Orsat apparatus pointing out that the equipment is capable of indicating flammable gases quantitatively even in concentrations as small as 0.1 per cent.

This same organization uses a carbon monoxide detector in which catalytic oxidation of the CO is promoted by hopcalite. A resistor element in the bed of the catalyst is heated in proportion to the amount of carbon monoxide present. As a result a Wheatstone bridge circuit is unbalanced and an alarm sounds when the concentration of CO exceeds a safe limit.

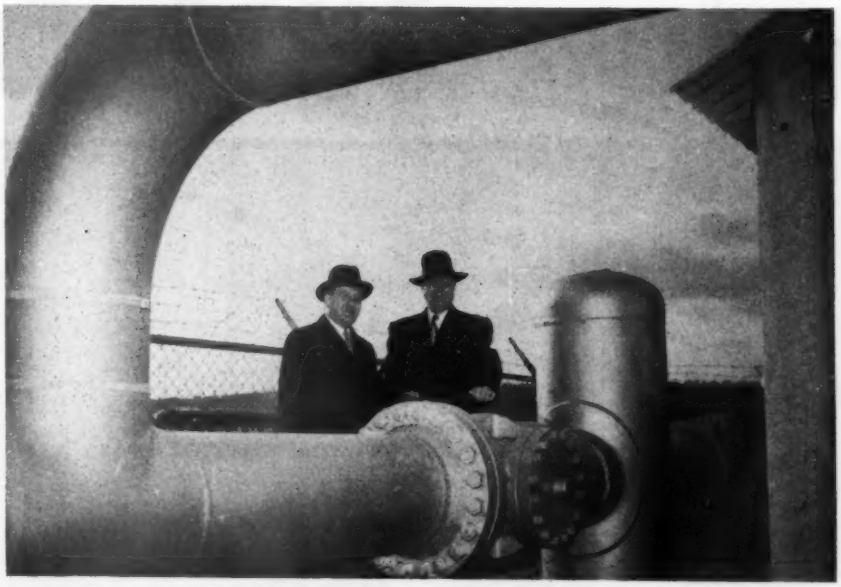
The performance of this device used primarily to indicate the presence of toxic concentrations of monoxide is checked by a tester employing color changes in chemical reagents.

Company "D"

Distributes manufactured and natural gas mixture.

"A standard combustible gas indicator is used for on-the-job spot checking. Atmospheres from vaults, tunnels, and other substructures are analyzed for carbon monoxide by means of the Bureau of Mines iodine pentoxide apparatus. Oxygen contents of questionable atmospheres are analyzed either in an Orsat apparatus or by means of the Bureau of Standards gas analyzing apparatus."

NEW YORK WELCOMES NATURAL GAS



Benjamin F. Feinberg (left) and Claude A. Williams (right) turn on natural gas from the new Transcontinental pipe line.

NATURAL gas began flowing into New York January 16 from the 1840-mile line of Transcontinental Gas Pipe Line Corp. Extending from the Rio Grande to the Hudson River, it is the world's longest pipe line.

Claude A. Williams, President of Transcontinental, and Benjamin Feinberg, chairman of New York State Public Service Commission, turned the main valve at the Hudson River metering station and lighted the gas. Mr. Williams also appeared on the morning "Tex and Jinx" radio program for an interview.

The ceremony marked the arrival of the first natural gas for use by the larger gas companies of the metropolitan area. New York and Richmond Gas Co. has been distributing straight natural gas for more than a year on Staten Island.

Mr. Williams predicted that New York City customers will be burning straight natural gas within five years. Brooklyn Union Gas Co. is planning conversion by March 1952 and Consolidated Edison estimates that Westchester County customers will be using straight natural gas in 1952, he said.

Company "E"

Institution engaged in technical research.

"In our experience we have employed the procedures and instruments listed under I, II, and III in the following outline for detecting and determining the source of gas leaks in the laboratory and field. . . . We propose the ideas listed under heading IV for possible development in gas leak detection practice.

I. Detection of gas leaks

A. Canaries have been used to indicate safe working atmospheres.

B. Carbon Monoxide Alarm, Cat. No. DR-42160. Made by Mine Safety Appliances Co. Designed to give an audible and visual indication when CO concentration in the atmosphere reaches a predetermined instrument setting, usually 0.02 to 0.04 per cent. In our experience with this instrument in the laboratory, we find that it gives an alarm whenever containers of volatile solvents are opened. It has also been noted that temperature fluctuations lead to faulty operation.

II. Location of gas leaks

A. Soap solution is used to find gas leaks around joints, gaskets, and other closures.

B. Presto-Lite Leak Detector—made by Linde Air Products Co. Designed to locate gas leaks in lines constructed of any material.

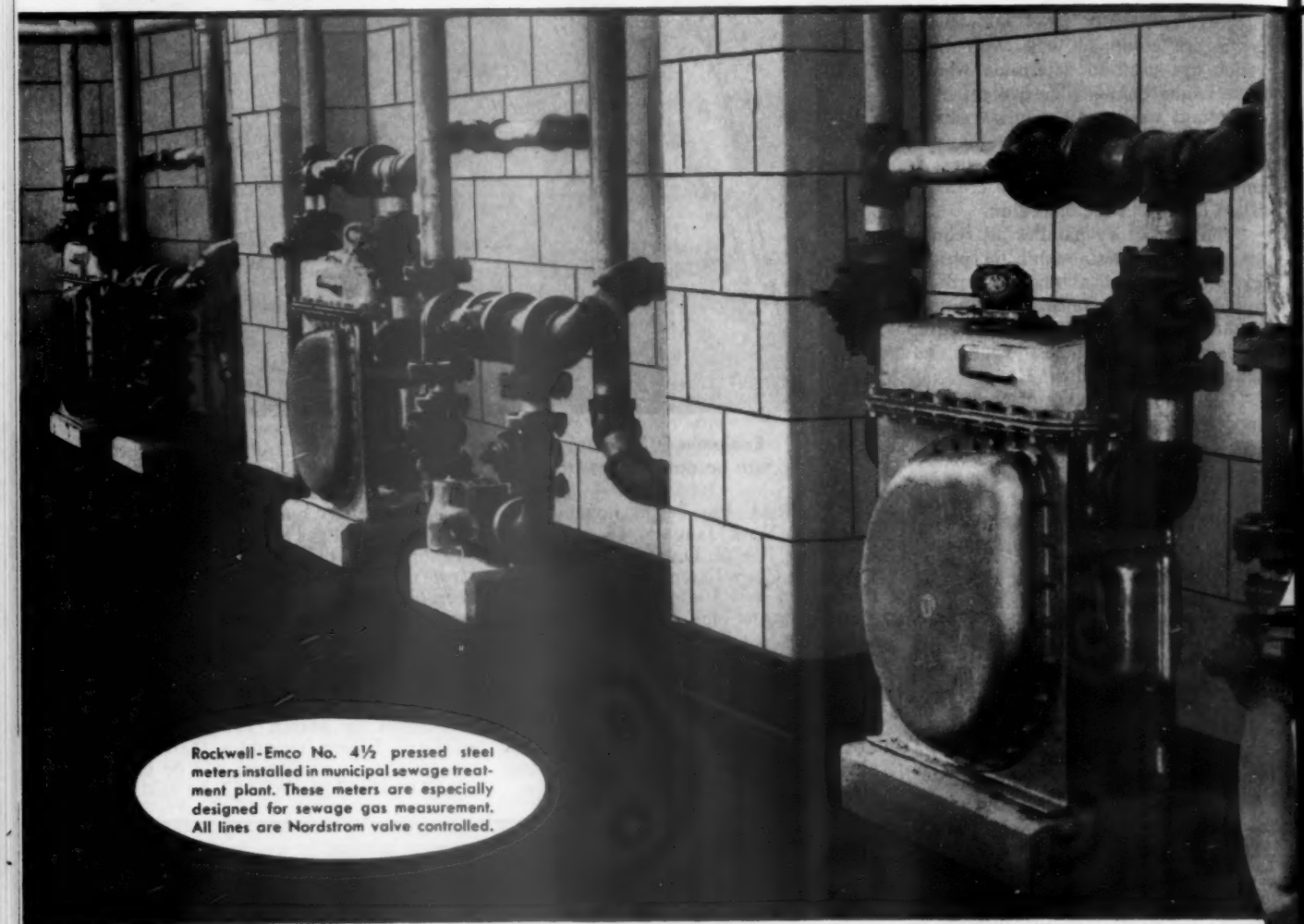
C. Model 2 Explosimeter, Cat. No. DN-43351. Made by Mine Safety Appliances Co. Designed to indicate the presence of any combustible gas in the atmosphere in concentrations from below the lower explosive limit to concentrations within or above the explosive range.

D. Heat Prover—made by Cities Service Oil Co. Designed for use in the improvement of the efficiency of combustion processes by the determination of combustibles, particularly H_2 and CO, and oxygen in flue and exhaust gases.

E. Colorimetric Carbon Monoxide

(Continued on page 26)

modern Fuel bins...



Rockwell-Emco No. 4½ pressed steel meters installed in municipal sewage treatment plant. These meters are especially designed for sewage gas measurement. All lines are Nordstrom valve controlled.

ROCKWELL meters and regulators

EMCO

Your Best investment in Measurement and Control

Meters

Tin

Aluminum

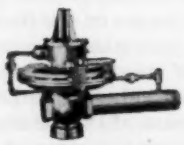
Cast Iron

Pressed Steel

Regulators

Appliance

Service



"1001"

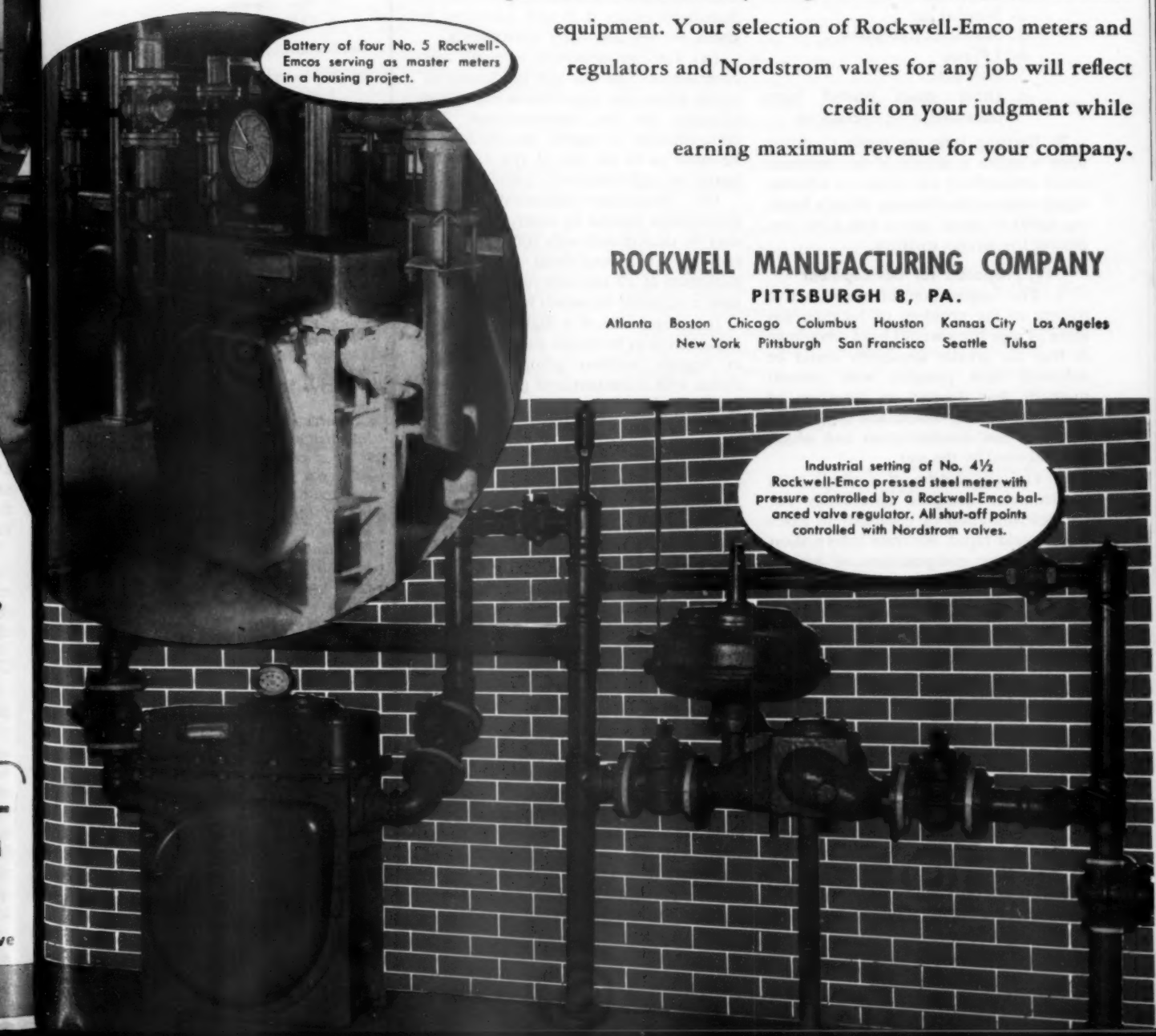
Balanced Valve

There's a ROCKWELL METER & REGULATOR for every use

CONTROLLED WELL BY ROCKWELL

Protect the Paying Part of Your Business!

At the pay-off point you give your big volume gas buyers the neatest appearing meter settings in a minimum of space when you build with Rockwell products. You benefit by using the finest, safest, most accurate equipment. Your selection of Rockwell-Emco meters and regulators and Nordstrom valves for any job will reflect credit on your judgment while earning maximum revenue for your company.



Battery of four No. 5 Rockwell-Emcos serving as master meters in a housing project.

Industrial setting of No. 4½ Rockwell-Emco pressed steel meter with pressure controlled by a Rockwell-Emco balanced valve regulator. All shut-off points controlled with Nordstrom valves.

ROCKWELL MANUFACTURING COMPANY

PITTSBURGH 8, PA.

Atlanta Boston Chicago Columbus Houston Kansas City Los Angeles
New York Pittsburgh San Francisco Seattle Tulsa

(Continued from page 23)

Indicator—Made by Mine Safety Appliances Co. Designed (by the National Bureau of Standards) for the rapid and accurate determination of CO in air in concentrations ranging from 0.001 to 0.10 per cent by volume.

F. Portable Carbon Monoxide Indicator, Cat. No. DS-9144. Made by Mine Safety Appliances Co. Designed to determine CO in the atmosphere in concentrations from 0 to 0.15 per cent.

G. Carbon Monoxide Detector, Cat. No. BF-6850. Made by Mine Safety Appliance Co. Designed to detect CO in concentrations ranging from 0.1 to 1.0 per cent.

III. Identification of leaking gas

A. Gas analysis by means of volumetric chemical methods and low temperature fractionation is used to establish the presence, type, and concentration of such gases as:

1. Sewer gas
2. Natural gas
3. Manufactured gases
4. LP-gas
5. Flue gas
6. Other gases vented from manufacturing operations

B. Burning tests are made to determine whether a sample of the contaminated atmosphere will ignite or whether it will support combustion when a burning splint is thrust into a test tube containing the air-gas mixture.

IV. Proposals for development

A. The application of radio active tracers to the problem of locating gas leaks in pipe lines would have advantage in that far greater sensitivity could be achieved than possible with present methods that depend on detection of odorizing agents, which are difficult to detect in low concentration and which are absorbed by the soil.

B. The application of a small mass spectrometer designed specifically for the determination of combustible gases would yield rapid, accurate information regarding the compositions of atmospheres contaminated by gas leakage.

Company "F"

This company serving a large geographical area summarizes its practices in each of its seven different districts as shown in Table 1 on page 22.

Summarization

In summarizing the practices followed in gas leak detection work which includes the examination of questionable atmospheres from the standpoint of toxic and explosive concentrations there are certain general observations to be made as follows:

1. It is not only inadvisable but practically impossible to attempt to locate and identify flammable gases by means of any one single instrument.

2. The instruments used must be known to be responsive to the particular gas expected to be encountered and at the same time indicate the presence or absence of all flammable gases in general. This is particularly important in the examination of atmospheres from sewers, pits, vaults, and similar sub-surface structures where contamination may arise from sewer gas, flammable and highly volatile solvents, and fuels such as naphtha and gasoline, as well as leaks of manufactured or natural gas from gas mains.

3. Atmospheres from confined areas to be entered by workmen where toxic or explosive gases may be suspected should be examined by means of a standard combustible gas indicator followed by a careful chemical analysis of the atmosphere, using a reliable gas analysis apparatus. If the combustible indicator does not show measurable quantities of flammable gases it is still advisable to check for the following constituents.

(a) Carbon monoxide in small concentrations. The Bureau of Standards' iodine pentoxide apparatus is highly satisfactory for this determination. The concentration of carbon monoxide may be such as to be out of the explosive range but sufficient to be toxic.

(b) The oxygen concentration of the atmosphere should be determined. This may be determined with sufficient accuracy on a standard Orsat apparatus. A minimum of 17 per cent oxygen by volume is required to sustain human life.

(c) Impurities of a highly poisonous nature such as hydrogen sulphide as well as organic sulphur compounds associated with manufactured gas should be determined.

4. Gas leaks usually affect trees, plants, and vegetation in general. Some companies make periodic vegetation surveys as a standard practice in looking for gas leaks.

5. Gas odors either from the inherent odor of the gas or from artificial odorants added are often helpful in locating gas leaks. However, while the odor of gas may indicate a gas leak, the absence of an odor should not in itself be considered as sufficient proof that a gas leak does not exist. Gas escaping through the ground, for example, may be entirely lacking in odor by the time it reaches the surface as a result of ground adsorption of the odor.

6. Gas volume discrepancies between meters located at some little distance from each other, but both measuring the same gas volumes, may be used as an indication of the possibility of gas leaks in the distribution system. This may prove helpful particularly to companies engaged in the transmission of natural gas.

American Gas Fundamentals

OUTLINE

Natural Gas
1. Geology
2. Drilling and Production

Manufactured Gases
1. Coke oven gas; producer gas, blue gas; carbureted water gas
2. Hi-Btu oil gas
3. Reformed gases

Transmission
1. Pipe lines
2. Corrosion and pipe protection
3. Compressor stations
4. Super compressibility
5. Hydrates and dehydration
6. Gas conditioning
7. Flow formulae
8. Orifice meter measurement

Gas Storage

Gas Distribution
1. System design and operation
2. Pressure regulation
3. Measurement and accounting

Gas Utilization
1. Combustion characteristics
2. Domestic
3. Commercial and industrial
4. Interchangeability

Conversion Practices

Management Problems and Policies
1. Corporate structure
2. Public utility regulation
3. Public relations

How to Use the Material

American Gas Fundamentals *is not intended as a training or service manual. It is a comprehensive compilation of basic gas facts to guide any gas utility employee toward a broader understanding of the industry as a whole. It is written in layman's language so that the technical fundamentals of every subject treated may be digested and understood by the non-technical reader.*

The series is designed to be removed from each current issue of American Gas Journal *and filed in a ring binder where it may be accumulated into a text book of permanent usefulness. Since the series will not run in sequence as outlined, material should be filed under the major subject head appearing in the upper right hand box at the head of each chapter.*

New subscribers to American Gas Journal *will be supplied free, upon request, with reprints of all previous chapters. Younger employees who may be required to serve in the armed forces will have put aside for them a full set of all texts that may be printed during their absence.*

Processes for Manufacturing Gas

MANUFACTURED gas, as the name implies, is produced from raw materials in facilities designed for that purpose. There are, strictly speaking, a great number and variety of gases that are manufactured. But for the purpose of this chapter the discussion will be limited to manufactured fuel gases, and of those, only to the few types that are of particular interest and significance to the gas utility industry.

While in recent years it has become common practice to transport natural gas hundreds of miles from the wells to the consuming areas, manufactured gas almost invariably is made in plants erected at or very near the utilities' distribution systems.

The commercial production of manufactured gas is based essentially on only two processes:

1. The decomposition of liquid or gaseous hydrocarbons, such as oil or natural gas, or of carbonaceous solids, principally coal, by the application of heat.

2. The chemical reaction between carbon and steam or oxygen in controlled quantity, to form gases composed largely of carbon monoxide and hydrogen. Heat must be supplied in the reaction of carbon and steam, whereas heat is evolved in the reactions between carbon and oxygen.

Coke oven gas and oil gas are examples of products of the first type of gas-making process. Coke oven gas is a product of the decomposition of coal by the application of heat. Oil gases are made by cracking gas oil, propane, gasoline, or other hydrocarbons.

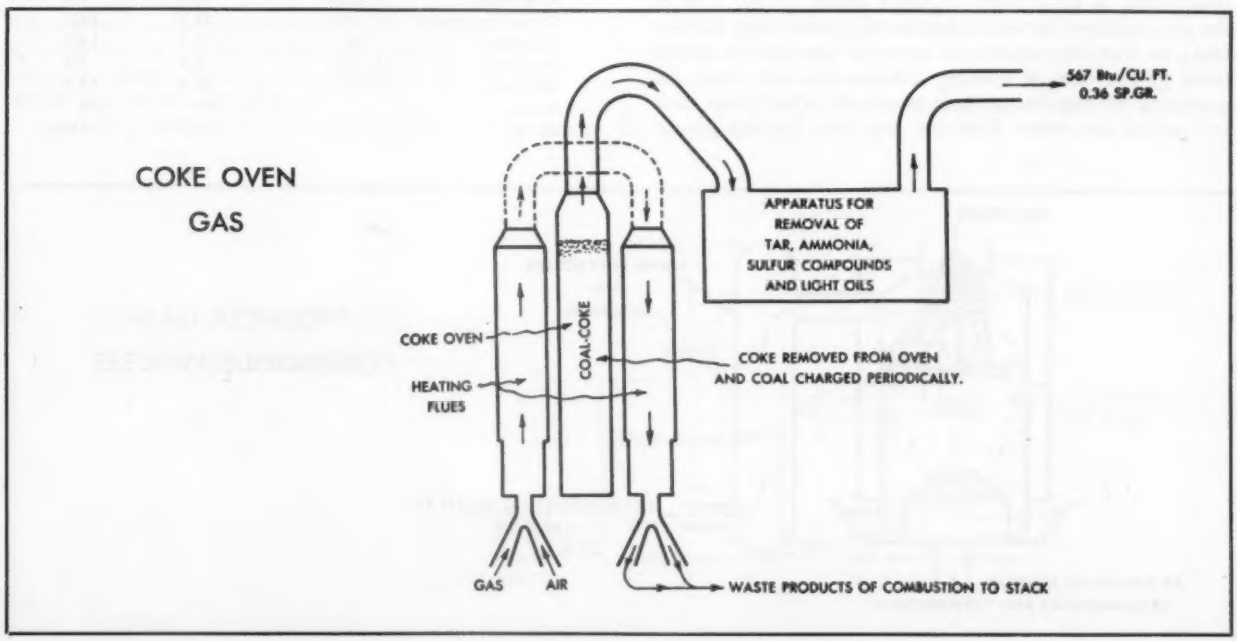
Blue gas (often called water gas) and producer gas are common examples of the second type of gas-making process. They are products of the chemical reaction (in controlled quantity) of carbon with steam or air.

All of the other combustible manufactured gases are mixtures of products made by one or both of the basic reactions. For example, carbureted water gas is simply a mixture of blue gas (water gas) and oil gas, made by cracking oil in the presence of blue gas and steam. In addition, various combinations of the basic gases, together with natural gas, result in a large number of mixed gases which are distributed by gas companies.

Coke Oven Gas

Coke oven gas is the gaseous product of the carbonization of bituminous coal in coke ovens of the by-product type, operated at high temperature. Such gas is treated for the removal of tar, ammonia, light oils, naphthalene and sulphur compounds, in order to make the gas suitable for domestic consumption.

The heating value of this gas varies somewhat depending on conditions of carbonization, type of coal used, and subsequent treatment of the gas. Coke oven gas usually has



a heating value of 550 to 570 Btu per cu. ft. if light oils have been removed in the process of debenzolization for the recovery of benzene, toluene, xylene, and other hydrocarbons. Coke oven gas is relatively light, having a specific gravity of 0.36 to 0.44, referred to air as 1.00.

An analysis of a typical coke oven gas is:

COKE OVEN GAS

		(by volume)
Carbon dioxide	CO_2	1.8 %
Illuminants	C_nH_m	3.3
Oxygen	O_2	0.2
Carbon monoxide	CO	4.5
Hydrogen	H_2	56.9
Methane	CH_4	29.3
Nitrogen	N_2	4.0
Btu/cu. ft.		567
Sp. gr.		0.36

Hydrogen and carbon monoxide account for over 60 per cent of coke oven gas by volume. These constituents have considerable influence on the burning characteristics of the gas, since they burn with a short, hard flame; that is, the rate of flame propagation is high. The high content of hydrogen is responsible for the low specific gravity of coke oven gas.

The methane content of coke oven gas is generally between 25 and 30 per cent. This constituent is of rather high heating value and accounts for more than one-half of the Btu content of the gas. Methane has entirely different burning characteristics than hydrogen and carbon monoxide and burns with a long, soft flame.

The term "illuminants" is used to include certain higher hydrocarbons which are present in coke oven gas, chiefly ethylene, but also other unsaturated and aromatic hydrocarbons. This portion of the gas has a high heating value but constitutes only three per cent of coke oven gas by volume.

The volume of coke oven gas which can be supplied from any plant is a function of the number of coke ovens installed and the capacity of the ovens for handling coal. There is some flexibility in the volume of gas which can be obtained from a coke oven plant for distribution. The underfiring of coke ovens requires about 35 per cent of the gas produced (or equivalent heating units from another fuel) so that the volume of send-out gas can be varied from 65 per cent to 100 per cent of the coke oven gas produced by regulating the amount of other gases used for heating the ovens. Producer gas, blast furnace gas, or other gases can be used for heating the coke ovens. The output of gas can also be varied by changing the coking time.

Assuming that the entire volume of coke oven gas is available for distribution, about 10,500 cu. ft. of gas at 567 Btu per cu. ft. is the production per ton, of typical coking coal.

Because of the high investment in a coke oven plant, economic considerations make it desirable to operate at full capacity as nearly as possible. Under favorable conditions, which include operating at a near capacity rate, and a ready market for coke and by-products, the coke oven process will produce city gas more economically than other methods.

Where coke ovens are used to produce city gas, the coke oven gas has generally been considered a base-load gas. Base load gas, as the utilities use the term, is a volume of gas which is required every day in the year. Utilities' gas requirements in excess of this base load vary widely from day to day and are generally supplied by the carbureted water gas process, described below.

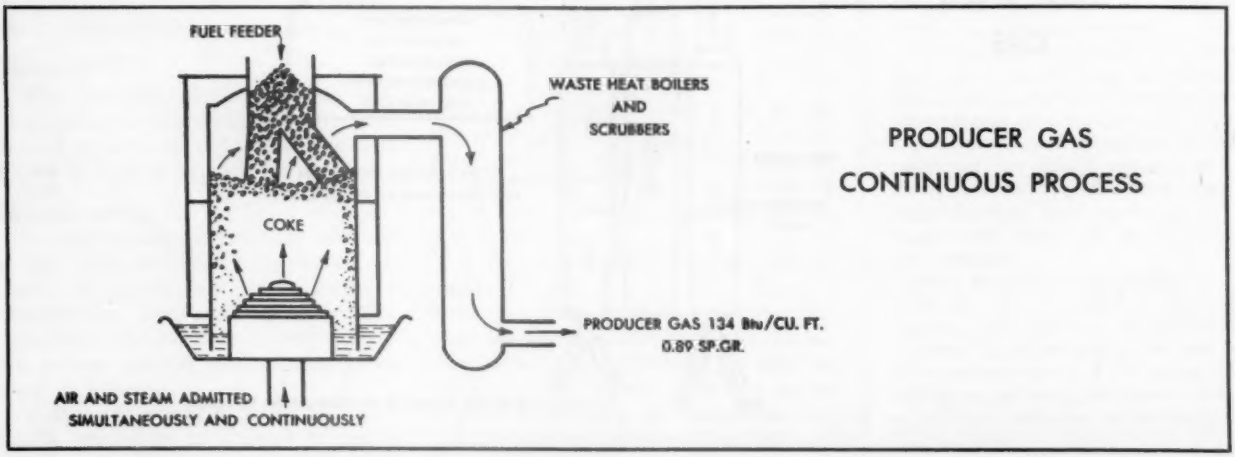
Producer Gas

Producer gas is made by blowing air and a small quantity of steam through a fuel bed, which is normally coke but can be bituminous coal, or anthracite. The process is continuous, since the ratio of steam to air is carefully controlled in order to balance the exothermic and endothermic reactions involved. An exothermic reaction is one in which heat is evolved; endothermic, one in which heat is absorbed. Because of the use of air, producer gas contains a high proportion of nitrogen. Its heating value is low, some 134 Btu per cu. ft. when made from coke, while the specific gravity is high, in the neighborhood of 0.90.

An analysis of a typical producer gas is:

PRODUCER GAS

		From Coke	From Coal
Carbon dioxide	CO_2	5.0 %	4.0 %
Illuminants	C_nH_m	0.0	0.5
Carbon monoxide	CO	28.0	28.0
Hydrogen	H_2	12.0	14.0
Methane	CH_4	0.5	3.0
Nitrogen	N_2	54.5	50.5
Btu/cu. ft.		134	178
Sp. gr.		0.89	0.86



Large volumes of producer gas are used in industrial processes and for underfiring coke ovens. Because of its low heating value, producer gas is generally used close to the point of production and is not normally transported in pipe lines for use at a distance.

Producer gas by itself is not suitable for distribution by utility companies because of its low heating value, and also because of its high carbon monoxide content. It can be used, however, to dilute coke oven gas or other gases so as to produce a gas of uniform heating value in accordance with prevailing city or state standards.

The equipment necessary for the manufacture of producer gas is fairly well standardized. A gas producer is a refractory-lined or water-jacketed shell with a stationary or rotating grate for the removal of ash. There are means for charging the fuel periodically and for admitting air and steam to the fuel bed, generally from the bottom. Auxiliary equipment consists of waste heat boiler, gas scrubber, gas and air boosters, and relief gas holder.

The output of a gas producer varies with many factors such as grate area, fuel used, size of fuel, blast rate, etc. The ordinary producer is seven to 12 feet in diameter.

A gas producer having an inside diameter of 10 feet, using coke as fuel, will gasify from 50 to 100 tons of coke per day; one using 100 tons of coke per day will produce about 7150 cu. ft. of gas per sq. ft. of grate area per hour.

Blue Gas (Water Gas)

Blue gas, or water gas, is made in a cyclic process in which a fuel bed, generally of coke, is alternately subjected to blasts of air and steam.

A blue gas apparatus is essentially the same as a gas producer, except that additional equipment is included to permit cyclic operation; that is, alternately heating the fuel bed with air and making gas with steam.

The preparation period, during which air is being forced through the fuel bed is referred to around gas plants as the "blow," and the steam blast portion of the cycle is called the "run."

During the blow the fuel bed is raised to incandescence by the combustion of the fuel with air from the air blast. During the run the air blast is shut off and steam is passed through the hot fuel bed to form a mixture of carbon monoxide, hydrogen, and carbon dioxide by the reaction of steam with carbon in the fuel.

In passing through the incandescent fuel bed the steam breaks down into hydrogen and oxygen, and the oxygen combines with some of the fuel to make carbon monoxide.

During this production period or run, the fuel bed loses heat, so that the gas making must be interrupted periodically to restore the temperature of the fuel bed by blasting with air.

When the gas-making reactions have cooled the firebed, the steam is shut off and air blast started to restore the heat in the fuel bed.

There are many variations in the cycles used, all of which pertain to the route which the steam or air follows through the apparatus. These variations are devised by designers and manufacturers of gas making equipment to achieve greater efficiency in gas making operations. During the production period or run, the bottom of the fuel bed cools more quickly than the top. Therefore the run may be split into three parts. In the up-run, the steam flows through the fuel bed from the bottom to the top. In the down-run, the steam flow is from the top of the fuel bed to the bottom. A down-run is followed by a second up-run to clear the space below the fuel bed of combustible gases.

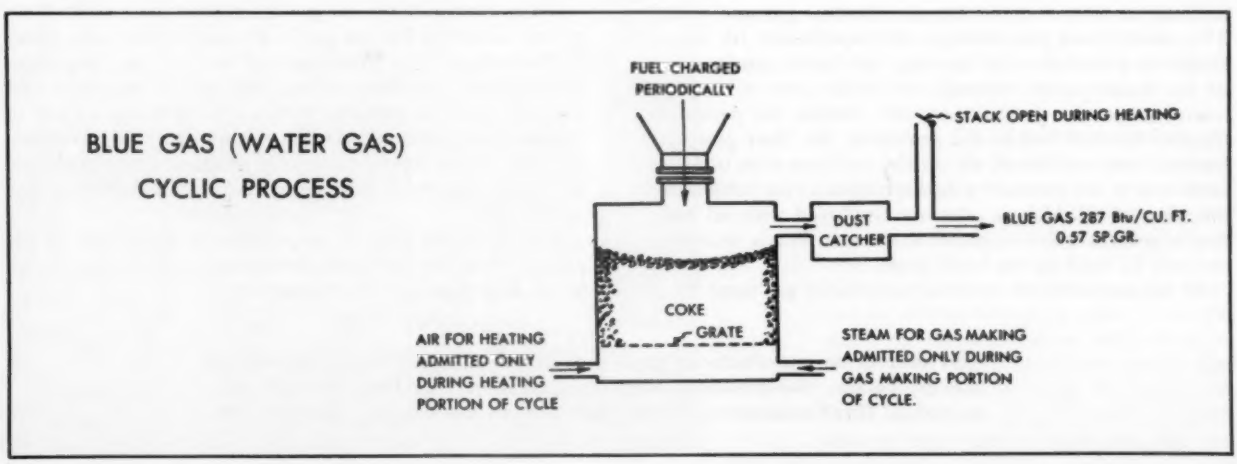
A blue gas generator has means for periodically charging fuel and for removing ash or clinker from the base of the generator. Some generators are equipped with automatic grates for continuous removal of ash, although in many cases the clinker is still removed by laborious hand-clinkering. Waste heat boilers and dust traps are frequently provided as well as automatic means for reversing the valves during the cycles.

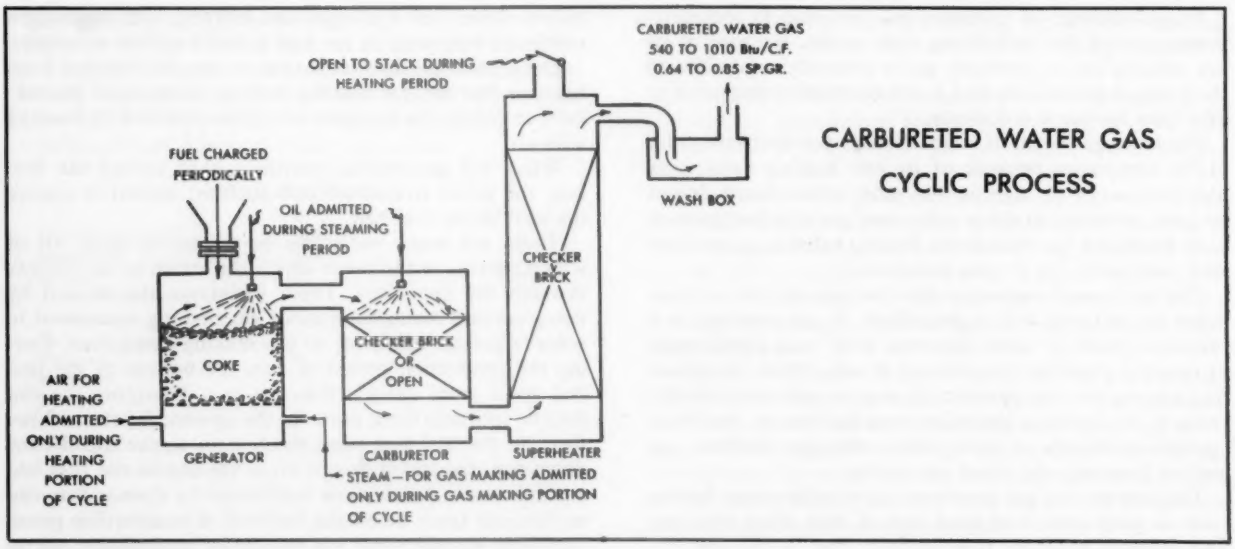
Blue gas normally has a heating value just below 300 Btu per cu. ft., but this value can be decreased by permitting a portion of the blow-run gases to mix with the make-gas. The specific gravity of blue gas is about 0.57 referred to air as one. An analysis of a typical blue gas is:

BLUE GAS

Carbon dioxide	CO_2	5.5 %
Carbon monoxide	CO	37.3
Hydrogen	H_2	47.6
Methane	CH_4	1.2
Nitrogen	N_2	8.4
Btu./cu. ft.		287
Sp. gr.		0.57

Blue gas, because of its relatively low heating value, is not distributed for city gas but is generally enriched by oil gases or other available gases of higher heating value. Blue gas, also, is toxic because of its content of carbon monoxide.


BLUE GAS (WATER GAS)
CYCLIC PROCESS
FUEL CHARGED PERIODICALLY
STACK OPEN DURING HEATING
DUST CATCHER
BLUE GAS 287 Btu/CU. FT. 0.57 SP.GR.
COKE
GRATE
AIR FOR HEATING ADMITTED ONLY DURING HEATING PORTION OF CYCLE
STEAM FOR GAS MAKING ADMITTED ONLY DURING GAS MAKING PORTION OF CYCLE.



The gas capacity of a blue gas set is determined by grate area, type and size of fuel used, and the rate of blasting and steaming. A generator of nine feet inside diameter can produce about 6,000,000 cu. ft. per day of blue gas of the heating value indicated. This is equivalent to about 4000 cu. ft. of gas per square foot of grate area per hour.

Carbureted Water Gas

For city gas purposes blue gas, which is essentially a mixture of carbon monoxide and hydrogen having a heating value just below 300 Btu per cu. ft., is enriched, as soon as made with oil gas. The gas thus enriched is called carbureted water gas. Formerly, it was standard practice to enrich blue gas to about 530 Btu per cu. ft. by the addition of oil gases. In recent years the demand has been for gases of higher heating value as an auxiliary or replacement for natural gas. Consequently, by proper manipulation of oil addition, it has been possible to produce a carbureted water gas having heating values of over 1000 Btu per cu. ft.

A conventional carbureted water gas apparatus consists of three shells—the generator, carburetor, and superheater. The generator is the same type of apparatus in which blue gas is produced. The blue gas passes from the generator into the carburetor, into which oil is sprayed to form an oil gas in the presence of blue gas and steam. The mixed gases pass through the superheater for fixing, thence to a wash-box for cooling, and initial condensation of the water gas tar formed. As in the case of blue gas manufacture, the process is cyclic. During the period of blasting the fuel bed in the generator, the blast gases are burned, with additional air, in the carburetor in order to store heat in the carburetor and superheater for subsequent cracking of oil. Many cycles are employed with oil addition at several different places in the sets. Waste heat boilers may be used on the blast gases.

In the manufacture of carbureted water gas some tar is produced and this is removed as a by-product. This gas must also be purified of its sulphur compounds to meet service standards.

Analyses of typical carbureted water gases of varying heating values are:

CARBURETED WATER GAS

Carbon dioxide	CO_2	3.4%	4.3%	1.8%	1.6%	4.4%
Illuminants	C_nH_m	8.4	12.6	19.7	18.9	27.4
Oxygen	O_2	1.2	0.7	0.3	0.2	1.1
Carbon monoxide	CO	30.0	30.2	25.7	21.3	9.1
Hydrogen	H_2	31.7	29.3	29.2	28.0	19.9
Methane	CH_4	12.2	17.8	13.5	20.7	21.8
Ethane	C_2H_6	0.0	0.0	5.2	4.3	5.3
Propane	C_3H_8	0.0	0.0	0.0	0.0	0.3
Nitrogen	N_2	13.1	5.1	4.6	5.0	10.7
Btu/cu. ft.	—	540	695	811	850	1010
Sp. gr.	—	0.64	0.68	0.70	0.69	0.85

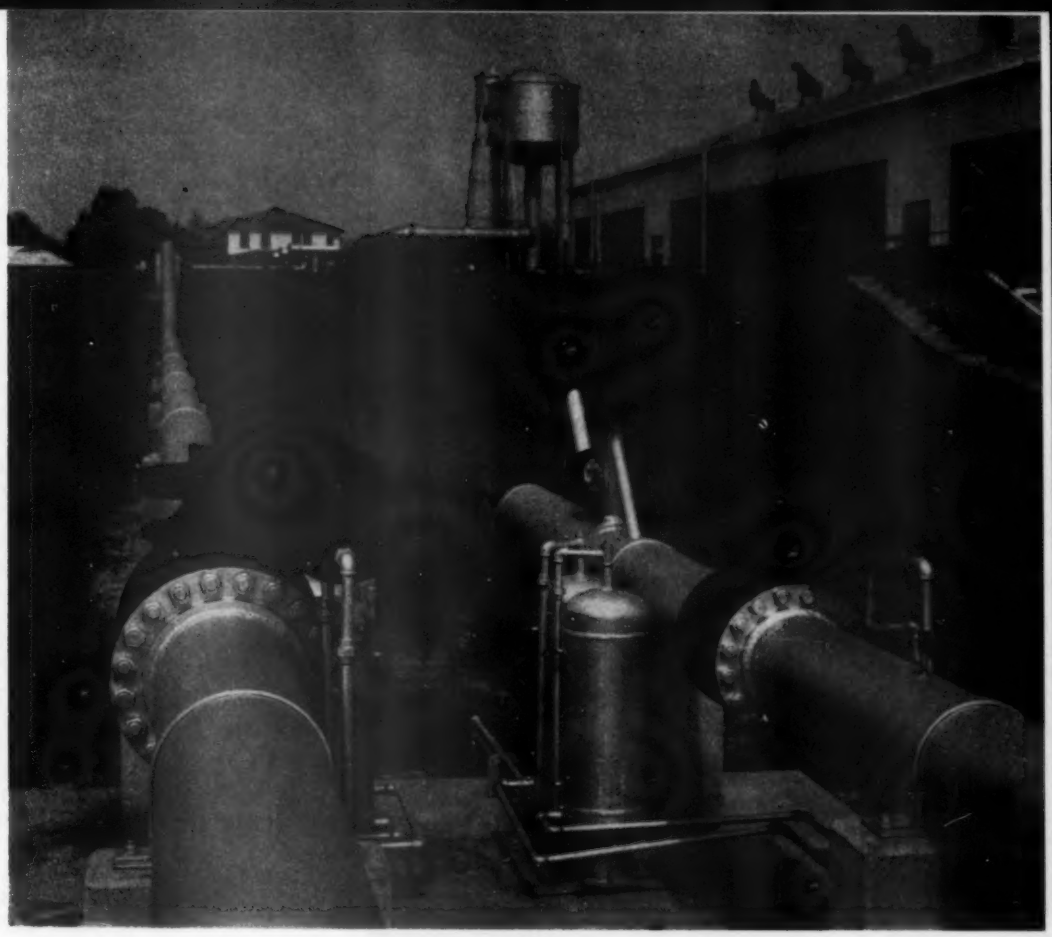
The capacity of a carbureted water gas set varies with the heating value of the gas made. A set having a generator of nine feet inside diameter will produce as much as 10,000,000 cu. ft. per day of 530 Btu gas but probably about 5,500,000 cu. ft. per day of 1000 Btu gas. These results are for generators equipped with mechanical grates and operating with Bunker "C" oil.

When carbureted water gas is enriched to heating values of well over 600 Btu per cu. ft. the gas is commonly called Hi-Btu oil gas. The production of this rich gas has introduced some important refinements in the standard carbureted water gas process. This is at present the subject of a great amount of research in the manufactured gas industry. The aim of this research is to produce a manufactured gas which can be used to supplement or entirely replace natural gas.

Because of the growing importance of the Hi-Btu oil gas process, this subject will be treated in detail in a later chapter of *American Gas Fundamentals.*

This chapter on manufactured gases was prepared under the supervision of Joseph Becker, vice-president, Koppers Company, Inc., from material contained in "Gas Fundamentals," copyright 1950 by the Koppers Company, Inc.

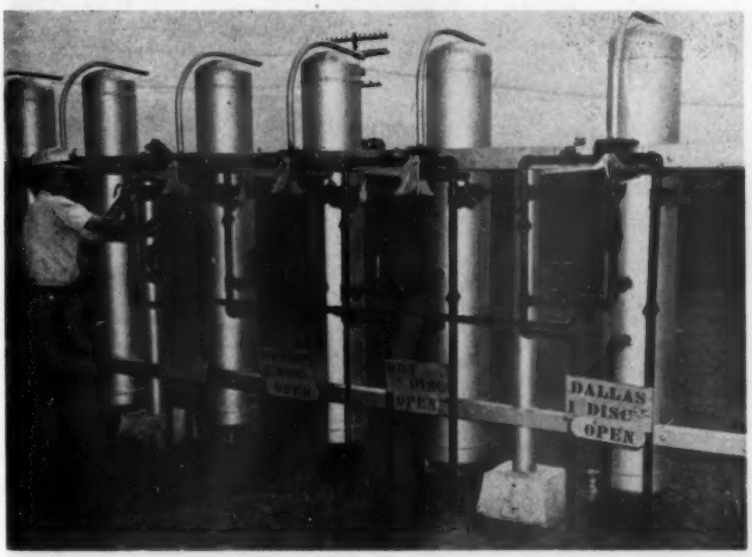
The recently installed safety device automatically closes these head valves at the Latex compressor station in the event of a blowout.



from United Gas Log

Life and Equipment Are Protected With Automatic Safety Device

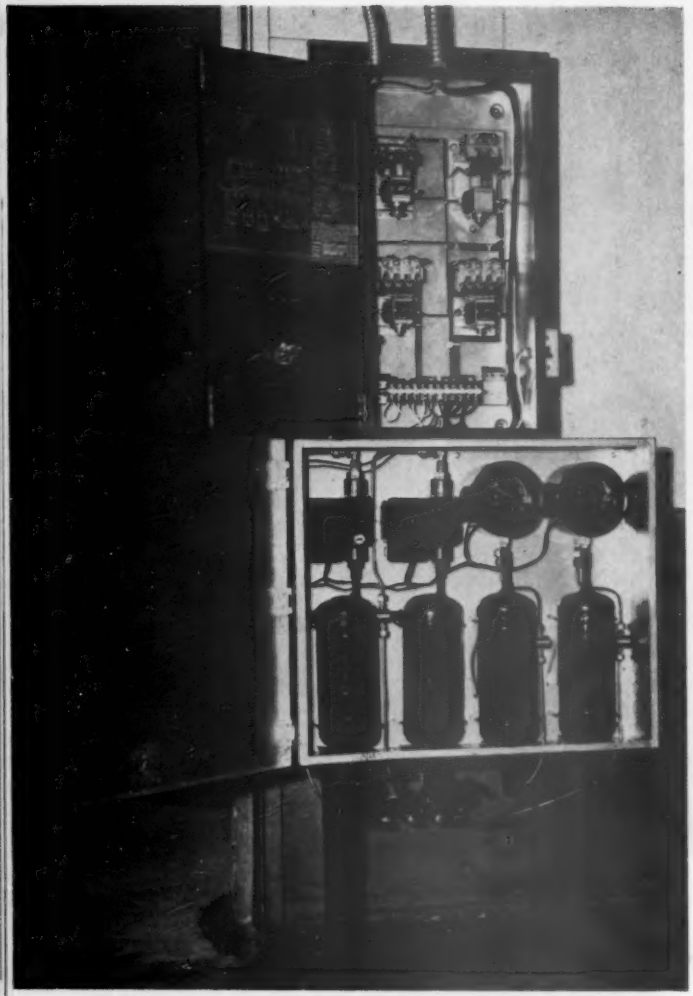
These air storage tanks automatically close the head valves when a blowout occurs. The operator shows how air can be applied manually when necessary.



A BLOWOUT within or in the immediate vicinity of a compressor station doesn't happen very often. But it can happen! And when such an emergency does occur, carrying with it the threat of disastrous fire, personal safety demands that operators clear out as quickly as possible.

Although a compressor station represents a very large investment in plant facilities and equipment, a split-second delay is risky, and returning to the threatened area to shut the plant down might have fatal results.

How this kind of a situation has been met by United Gas Pipe Line Co. is the story of the conception and development of a blowout safety device for compressor stations by H. W. Egger and R. C. Henderson, general superintendent and assistant general superintendent, re-



The relay panel, in the upper portion of the picture, is in use at the Latex compressor station where battery ignition requires fewer relays than a magneto ignition engine. The open cabinet below it holds the dead end volume chambers. (See close-up at bottom of page 33)

The picture at the bottom of the page shows a testing set-up used to simulate a blowout. A six-inch orifice in the eight-inch valve was necessary to actuate the automatic shut-down controls.

spectively, together with cooperation of other employees of United Gas Pipe Line Company's compressor station department. By means of completely automatic shut-down controls, a plant goes out of service when a blowout occurs, leaving operators on duty with no other thought than their own safety.

The device, now completely tested and installed at Latex and Sterlington compressor stations and being installed at Mineola compressor station, consists of several electrical circuits and utilizes both gas and air pressure lines arranged to automatically shut down any number of magneto or battery ignition gas compressor engines and to close the suction (inlet) and discharge (outlet) head gates, in the event of a break in the high pressure piping within or adjacent to the station.

The suction and discharge headers are piped to two or more small dead end volume chambers, which may be four-inch by 12-inch, or larger. Pipe of one or two inches in diameter, or larger, may be used up to a point near the volume chamber where it should be swedged down to one-quarter inch, the larger lead lines having the greater sensitivity.

Mercoid differential control switches are connected across small chokes located close to each volume chamber (1/32-inch choke for a four by 12-inch chamber). These controls are set by the manufacturer to be most sensitive at the average pressure prevailing in the lines under control but will function satisfactorily over a wide range. The switches close electrical circuits when the differential pressure across the chokes increases to 15 pounds. They open the circuits when differential pressure decreases to zero.

A "square d" relay and timer is connected to the mercoid differential controls. Current for operating the relays is supplied by a 12-volt battery—kept fully charged by a trickle charger—to make the device independent of the usual power sources. The timer may be set to open the relay circuit after an interval up to three minutes, during which time all controls will have completed their cycle.

This relay panel incorporates a manual push button for the purpose of testing operation of the relays at intervals. The push button may be used also to operate the shut down controls, which is desirable in the event a gasket should blow out, or other comparatively small leak should develop that would not release sufficient pressure to actuate the automatic controls.

In addition to the relays controlling engine ignition, a single relay is provided to close a circuit connected to electrically operated valves, which open automatically and admit air pressure to close pneumatic remote control suction and discharge head valves. This circuit

V. W. Bachus, chief engineer, Sterlington, resets the valve on the compressed air line.

W. A. Tabb, chief engineer, Latex, points out the push button for a manual shut-down.

may also be tied directly to motor-operated head valves.

The mercoid differential control is the heart of the blowout Safety device. The normal variations in line pressure change the pressures in the dead end volume chamber, but the movement of gas through the choke is not of sufficient velocity to create a differential pressure large enough to close the mercoid switch.

An abrupt lowering of the pressure, which occurs when there is a blowout within the area under control, creates a velocity through the choke by the back flow. This velocity is sufficient to produce the required differential pressure across the orifice, instantly closing the electrical circuit that energizes the shut-down relays.

One or more relays render the engine ignition system inoperative by shorting out magneto ignition engines, or by opening the battery circuit on battery ignition engines. Another relay closes the

Here is the Mercoid differential control, which is the heart of the blowout safety device. A sudden drop in pressure on the line causes a differential across orifice choke (2). This differential (15 pounds or greater) actuates Mercoid differential switch (1), closing electrical circuit to magneto grounding relays or circuit breaker. Current is also applied to a circuit breaker which closes and energizes motor valves.

These valves open and admit air pressure to closing line on head gates. Thus engines are shut down and head gates are closed simultaneously. Check valve (3) prevents sudden damaging pressure to upper bellows of Mercoid differential switch. The scored seat in this check valve allows pressure to build up slowly on upper bellows and also acts as a choke to reduce pulsations from line on bellows.

circuit to the electrically operated valves that open automatically, admitting air from air storage tanks to the line cylinders. These cylinders are located at the suction and discharge head gates that are closed in a matter of seconds when air pressure is applied to their hydraulic chambers. The circuit may also control motor operated head valves.

An independent battery circuit of suitable voltage to operate the motorized valves—kept fully charged by a trickle charger—completes the automatic shutdown set-up and insures its dependability in any emergency involving a rupture in the pressure lines anywhere within the area between the suction and discharge head valves.

Accompanying illustrations show the details of completed installations at Latex and Sterlington compressor stations. As previously mentioned, installation of automatic shut-down equipment is under way at Mineola compressor station.

In addition, a number of other United compressor stations are equipped with automatic shut-downs for engines in the plants, although automatic controls are yet to be installed for head valves. Future plans provide for these, as well as for the added safety and efficiency afforded by the blowout safety device at all United compressor plants.

A new Universal—the Eton model.

1951 Ranges Announced By Cribben & Sexton

Cribben and Sexton Co. has announced its 1951 line of Universal gas ranges. There are four completely new models—the Gotham, a 21-inch wide kitchenette range; the Eton, a 36-inch model; the Manhattan, a 36-inch budget model; and the Amherst, a 36-inch bungalow range and heater.

Plus these four new models, there are three improved models from last year's line—the Marlboro, the Brockton, and the Berkshire.

Home Service Workshop Attracts 200

THE importance of home service departments in establishing good community relations was one of the major themes presented to nearly 200 home service representatives and gas industry sales representatives at the American Gas Association Home Service Workshop in Washington, D. C., January 3, 4 and 5. The impact of the gas industry on the daily lives of people was stressed by executives who addressed the meeting.

Vivian L. Marshall, New Orleans Public Service, Inc., chairman of the AGA Home Service Committee, greeted the confreres and outlined the purpose of the workshop. The exchange of ideas, through prepared papers and demonstrations as well as in discussion groups, was one of the most valuable results of the meeting, Miss Marshall declared.

Here and There With Home Service, a general symposium of home service activities, presented three different methods of selling gas services to the public. Julia Hunter, Lone Star Gas Company, Dallas, told how her company glamorized the blue flame as the gas industry's symbol. Educational leaders are an important segment of the public and Mrs. Arra Sutton Mixter, Hartford Gas Co., outlined her company's program in this field which included teachers' dinners, an equipment replacement program, as well as regular meetings with home economists, dietitians and health supervisors. Sue Herndon, Arkansas-Louisiana Gas Co., described a plan that proved successful in her territory whereby home economics students in colleges and universities could be enrolled as apprentices, gaining valuable training and at the same time greatly assisting understaffed home service departments. Students in Miss Herndon's area are making home calls, conducting dealers' meetings and doing contact work, as part of their home service studies.

Mrs. Helen Kendall, equipment editor, Good Housekeeping Institute, offered laundry hints, many of which were gathered from a recent survey made by the Institute, covering laundry habits and buying expectations of about 2,000 consumers. She reported that 84 per cent of the women surveyed owned and used washing machines and that 50 per cent of these used gas water heaters. About 20 per cent had electric water heaters leaving a margin of about 30 per cent using old fashioned methods of heating water. This group offered an excellent market for the gas industry, Mrs. Kendall said.

Different methods of getting the consumers angle were presented by Mrs. Eugenia Hatcher, homemaker testing service, General Foods Corp. Operating on the basis that it is better to see what 50 women do than to ask what 5,000 have done, tests are made of recipes and procedures in homes by consumers under the supervision of trained observers.

Everett J. Boothby, President, Washington Gas Light Company, welcomed the delegates at the conference luncheon on January 3.

Carl H. Horne, vice-president, Alabama Gas Corp., and chairman, Residential Gas Section, AGA, said home service girls could bring into sharp focus the superiorities of gas as a fuel. He said the industry needed a better gas range and promised the officers and members of the Residential Section would strongly support the upgrading program now under way. Mrs. Ida Jean Kain, a syndicated columnist, told the delegates to use psychology and a light touch in writing for the women's pages of their local newspapers.

Wednesday afternoon was devoted to discussion techniques, and twelve leaders guided group discussions. They were: Kathryn Barnes, Pittsburgh; Mary L. Bohn, St. Louis; Mildred Clark, Tulsa; Viola Becker, Waukeegan; Margaret Doughty, South Bend; Ruth Englehart, Poughkeepsie; Thelma Holmes, Savannah; Elizabeth Lynahan, Chicago; Isabel McGovern, Minneapolis; Judith O'Flaherty, Philadelphia; Dorothy O'Meara, Bridgeport, and Eleanor Wiese, Newark.

Ruth Sheldon, Washington Gas Light Co., presided at the meetings on January 4, which were held at the Washington Gas Light auditorium. Mrs. Ellen Bridges, Pittsburg, Kansas, gave a demonstration of platform training and Dr. Esther Phipard, bureau of home nutrition, Washington, told of research work being done in government and private laboratories on vitamins and other nutrition subjects.

Irene L. Muntz, Rochester Gas & Electric Corp., demonstrated the convenience made possible through use of frozen foods. Pat Hendrick, Muskogee, Okla., offered a demonstration based on a square dance theme, titled "Swing Your Partner."

Irving K. Peck, vice-president, Manufacturers Light & Heat Co., Pittsburgh, told the delegates they had a tremendous stake in their own utility companies. He advised the new home service girls to learn everything they could about the gas industry and about their own companies. The gas company is an important part of any community, and the home service girls represent one of the major contacts of the utility with the public.

A panel discussion on the home call was conducted with Eleanor R. Morrison, Grand Rapids, as leader. She was assisted by Katheryn Ashcraft, Columbus; Gladys Bramblett, Fall River; Shirley Fegert, Wichita; Mary N. Hall, Elizabethtown, N. J.; Kathryn O. Johnson, Spring Valley, N. Y.; Florence Neely, Baltimore; Katherine L. Rathbone, Los Angeles; and Elyse Van Dyke, Birmingham, Ala.

On January 5, a symposium on various activities of home service work in-

(Continued on page 42)

Index of Yields : Selected Utilities Stocks

	Jan. 1951	Dec. 1950	Nov. 1950	Oct. 1950	Sept. 1950	Aug. 1950	July 1950	June 1950	May 1950	Apr. 1950	Mar. 1950	Feb. 1950
Natural Gas Transmission Companies	5.36%	5.97%	5.62%	5.19%	5.71%	5.46%	5.76%	4.86%	4.70%	4.77%	4.57%	4.83%
Natural Gas Transmission & Distribution Companies	5.47	5.67	5.46	5.40	5.61	5.71	5.79	5.29	5.11	5.14	5.19	5.26
Manufacture & Mixed Gas Companies	5.22	5.56	5.46	5.24	5.52	5.55	5.76	4.98	4.66	4.77	4.71	4.75
Class "A" Electric Companies	5.62	6.19	6.03	5.56	5.67	5.59	5.64	4.94	5.13	5.24	5.15	5.38
Class "B" Electric Companies	5.80	6.38	6.06	5.99	6.06	6.35	6.41	5.58	5.30	5.37	5.42	5.37

Method of Compiling Index of Yields

This is a straight arithmetical index of comparative yields obtainable on a selected group of gas and electric utility industry common stocks.

The companies comprising this index have been selected by the AMERICAN GAS JOURNAL as providing a representative cross-section of each industry, from the standpoint of geographical diversification and of the relative importance of the individual companies in their areas.

No effort has been made to weight the average to give effect to changes in capitalization or in dividend rates because the yields afforded on the issues reflect such changes. The index is designed to show the rate of return and not necessarily market movements on the stocks comprising it.

The companies used in compiling this index are:

Natural Gas Transmission Companies: El Paso Natural Gas Co.; Northern Natural Gas Co.; Panhandle Eastern Pipe Line Co.; Southern Natural Gas Co.; Tennessee Gas Transmission Co.

Natural Gas Transmission and Distribution Companies: Columbia Gas System, Inc.; Consolidated Natural Gas Co.; Lone Star Gas Co.; Oklahoma Natural Gas Co.; Pacific Lighting Corp.

Manufactured and Mixed Gas Companies: Bridgeport Gas Light Co.; Brooklyn Union Gas Co.; United Gas Improvement Co.; Peoples Gas Light & Coke Co.

Class "A" Electric Companies: Boston Edison Co.; Commonwealth Edison Co.; Houston Lighting & Power Co.; Southern California Edison Co., Ltd.

Class "B" Electric Companies: Dayton Power & Light Co.; Hartford Electric Light Co.; Pennsylvania Power & Light Co.; Public Service Co. of Colorado; San Diego Gas & Electric Co.

John F. Falvey

PUBLIC utility common stocks have been giving a good account of themselves during recent weeks. Their improvement in price has been gradual and fairly steady, in sharp contrast to the jittery behavior of leading industrial company shares. On market reactions, furthermore, the utility shares have given ground grudgingly.

Search for yields has been the predominant factor in this market experience for the utility shares. This is indicated in the quick and favorable market reaction of several utility issues to increases in dividends ordered by directors at their latest meetings.

Underlying this favorable market trend for the utility shares has been the increasing amount of pension and trust funds which has found its way into these stocks for the stable and liberal dividend return afforded. This flow of funds into the utility shares is expected to continue, unless the stock market as a whole shou!d "fall out of bed" to use the old market adage.

Trying to judge the possible future course of prices for stocks as a whole is something akin to finding a needle in a haystack. The imponderables are numerous, and just as numerous are the possible reactions of investors to any given set of circumstances.

Many stock purchases during the very recent past have been made as a direct inflation hedge and not because of confidence in the upward trend of corporate profits. *Anything is preferable to the dollar* seems to have been the impelling motive. The demand has not been confined to stocks but has encompassed all things tangible—diamonds, real estate, furniture, apparel and appliances of all types.

Care in selection of securities has not been a vital requirement. "Cat and dog" stocks have been eagerly sought after as an avenue toward easy profits—and they have paid off. How long this condition may continue is anyone's guess, but with the Washington administration seeking every possible loophole to avoid proper economic controls in its lust for votes, the prospects are dubious.

The only consolation is that investment funds must seek a haven, and in so doing these growing funds have as their prime requirements liberal income and safety insofar as the latter is obtainable. In their essence, utility shares meet both these requirements.

The Threat to Profits

A serious question for corporate stocks as a group is what would happen in the event corporate profits in 1951 should fall by anywhere from 10 per cent to 20 per cent below their record high level of $21.9 billion attained in 1950, according to estimates made by the Council of Economic Advisers.

Such a development is altogether likely, as a review of the facts will show. First and possibly foremost—no less than $4.7 billion—or more than 20 per cent—of the 1950 profits were inventory profits. These are strictly non-recurring. If anything happens to stop or at least slow up the inflationary spiral, these non-recurring profits will disappear or diminish considerably.

Taxes will be about 75 per cent higher—according to present indications—and the need for still higher imposts to meet stiffening rearmament needs will send the tax figure still higher.

Add to these possibly still higher wages and extension of price controls—even on the recent makeshift basis—and the threat to profits is apparent.

While these factors threaten the industrial stocks, any unfavorable impact on the latter will make itself felt in the demand for utility shares, if for no other reason than the good fall with the bad in a down-turning market. The better part of wisdom by investment fund managers in that event would be to wait on the sidelines in the expectation that even more liberal yields will be afforded on the utility shares.

Special relief—and *justifiable* relief, it may be added—which has been given the utility companies in the recently enacted Federal tax bill has permitted managements of a few companies to be more liberal to stockholders. This has been no sudden shot in the dark but has been a development which would have been witnessed months earlier if it had not been for fear that an onerous tax bill wou!d preclude passing along to stockholders their fair share of corporate profits. Even with these increases in dividends, it will be noted that the average return to shareholders as measured by AMERICAN GAS JOURNAL index is only about 5.50 per cent.

Sharpest gains in market price among utility stock groups has been registered by issues in the manufactured and mixed

(Continued on page 48)

New Peaks Established During 1950 For Gas Appliance Sales

by Edward R. Martin
Director, Marketing and Statistics, GAMA

THE year 1950 saw gas appliance sales reach new peaks. During that year several important sales "firsts" were established. For example, for the first time shipments of:

1. Gas-fired central house heating equipment surpassed 1,000,000 units;
2. Automatic gas water heater shipments soared far above the 2,000,000 unit mark, and
3. Domestic gas range shipments surpassed 3,000,000 units.

Shipments of gas refrigerators, incinerators, clothes dryers, direct heating equipment, etc., throughout 1950 established new peaks or approached peak activity.

At the end of 1950, residential gas customers totaled 28,250,000. This includes both city gas customers and those served by the LP-gas industry. This means that at the end of 1950 the gas industry was serving 1,360,000 more homes than the 26,890,000 served on January 1 of the same year.

Of the 28,250,000 domestic gas customers served at the end of 1950, 22,450,000 received their gas through utility lines while the remaining 5,800,000 were located beyond the gas mains.

It is interesting to note that at the end of 1940 the gas industry was serving slightly more than 18,000,000 homes. Over a period of the past ten years, the industry has increased at a rate equivalent to 1,000,000 residential customers per year. Too, the acceptance of gas service beyond the gas lines is evidenced by the fact that LP-gas customers have increased five-fold since the end of 1940.

Industry-wide shipments of domestic gas ranges exceeded 3,000,000 units, or approximately 1,000,000 units more than the 2,069,600 units shipped during 1949. This establishes a new peak year. The previous peak year occurred in 1948, when shipments totaled 2,750,000 units. Prior to World War II, domestic gas range shipments approximated 1,430,000 units per year. Sales during 1950 more than doubled that figure.

Electric range shipments also reached a new high during 1950 and totaled 1,830,000 units as compared with 1,056,000 units in 1949. The previous peak occurred in 1948 when 1,600,000 electric ranges were shipped.

Industry shipments of automatic gas-fired water heaters during 1950 totaled in excess of 2,300,000 units. This establishes a new peak year and compares with shipments of 1,466,000 units in 1949. The previous "peak" occurred in 1947 when shipments totaled 1,800,000 units. Pre-war shipments of automatic gas water heaters averaged 426,000 units per year. Thus, 1950 sales, compared with the pre-war average, were approximately five and one-half times greater.

Shipments of electric storage water heaters during 1950 totaled 990,000 units. The peak year for electric storage water heaters occurred in 1947 when sales totaled 1,100,000 units.

Industry shipments of gas-fired central heating equipment during 1950 surpassed 1,000,000 units and established a new all-time peak. The industry's previous peak was established in 1946 when 662,500 units were shipped. Near peak levels were reached in 1949 when shipments totaled 637,000 units.

Actually, estimated shipments of gas-fired central house heating equipment during 1950 were:

Gas-Fired Furnaces	589,200 units
Gas Boilers	76,500 "
Gas Conversion Burners	338,600 "
TOTAL	1,004,300 units

Compared with pre-war average annual shipments, in 1950, shipments of gas-fired furnaces were 13 times greater; gas boilers 8 times greater; and gas conversion burners 12 times as great.

As for other gas heating equipment during 1950, shipments of floor furnaces and direct heating equipment totaled 650,000 units and 2,100,000 units, respectively.

Gas appliance manufacturers recognize that "business as usual" will not be a part of 1951. The essential metals supply, the defense program, man-power and controls are some of the items which will be at odds with expanding markets and the ever-growing acceptance of gas appliances. Actually, a recent GAMA survey indicates that the great majority of gas appliance manufacturers expect that production in 1951 will be about three-quarters of what it was in 1950.

These figures take on added significance when it is noted that companies representing about two-thirds of the 1950 production expect that about 28 per cent of their facilities will be devoted to defense production, during this year. Other gas appliance manufacturers indicate that they will build new facilities to take care of defense contracts.

Bluntly, 1951 looms as a year of uncertainty and the impact of world and national happenings upon our economy can not be foreseen, nor can consumer production be predicted with any degree of accuracy. The record performance of our industry during 1950 illustrates the increased facilities which can be devoted to defense production. We enter 1951 with a production capacity double what it was in 1941, just prior to the outbreak of World War II. Gas appliance manufacturers are confident that they possess both the capacity and flexibility to make increased contributions to any national emergency.

C. R. Bellamy Is Tech. Editor Of American Gas Journal

Chas. R. Bellamy

Charles R. Bellamy, well-known gas engineer, has become technical editor of AMERICAN GAS JOURNAL. He joined the staff of the JOURNAL in August, 1950, as editor of *American Gas Handbook*.

Mr. Bellamy plans to continue his active consulting work with gas companies throughout the country.

From 1929 to 1945 Mr. Bellamy was with the Columbia Gas System. He was a gas engineer, and then chief engineer, gas department, of Columbia Gas & Electric Co. He was also vice-president and director of Columbia Engineering and Management Co., and vice-president and director of Michigan Gas Transmission Co.

In 1945 Mr. Bellamy became an associate with E. Holley Poe & Associates. He was a gas industry witness in the investigation of the natural gas industry conducted by the Federal Power Commission, and was the chief witness on gas distribution and utilization. He did consulting work on gas problems in Canada, Mexico, and Venezuela, and was also consulting engineer on contract negotiations for Texas Eastern Transmission Corp.

While with Columbia and Poe & Associates, Mr. Bellamy was also consulting engineer for the Metropolitan Utilities District, Omaha, owner and operator of Omaha's gas and water department.

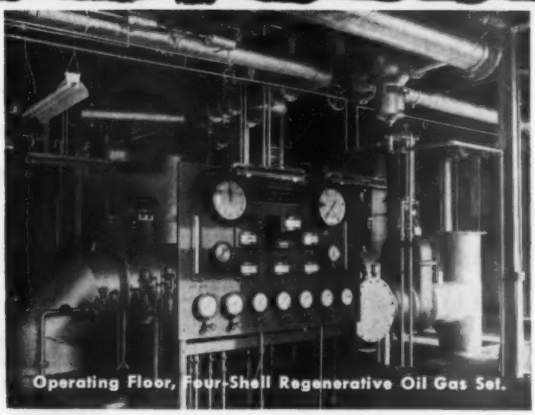
Mr. Bellamy graduated from Lafayette College in 1911. From then until 1925 he was with the Semet-Solvay organization, starting as a cadet engineer at the Steelton, Penna, plant. He later was transferred to the Indianapolis plant, where he was chief chemist in charge of the benzol, toluol and ammonia departments, and then assistant superintendent of the byproduct coke and gas plant.

Subsequently Mr. Bellamy was transferred to the main office at Syracuse, where he was gas engineer in charge of gas operations, all plants, and in charge of coking tests on American and foreign coals. He also negotiated the contract for the byproduct coke and gas plant at Hamilton, Ont.

From 1923 to 1929 Mr. Bellamy was a consulting engineer in New York, associated with William B. Blauvelt, formerly general manager of Semet-Solvay. Among their clients were: Texas Co.; Hamilton, Ont., Gas Co.; Waterbury, Conn., Gas Co.; Phillips Petroleum Co.; American Smelting & Refining Co.; American Chain Co.; American Rolling Mill Co.; Solvay American Co.; Foundation Co.; and Wilputte Byproduct Coke Oven Corp.

GASMACO *Oil Gas Processes*

(Patented and Patents Pending)



Operating Floor, Four-Shell Regenerative Oil Gas Set.

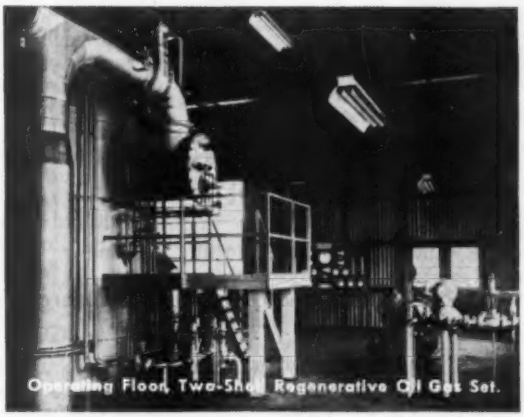
Six installations of Gasmaco two-shell regenerative oil gas are in regular operation, supplying the base load in these utility plants.

Numerous installations of the Gasmaco twin-generator and single generator oil gas process have been giving outstanding service over the past five years. Recent installations of these processes have been employing heavy high carbon oils. Additional installations of this type are now under construction — some for peak shaving with gas oil, others base load operation with heavy oil.

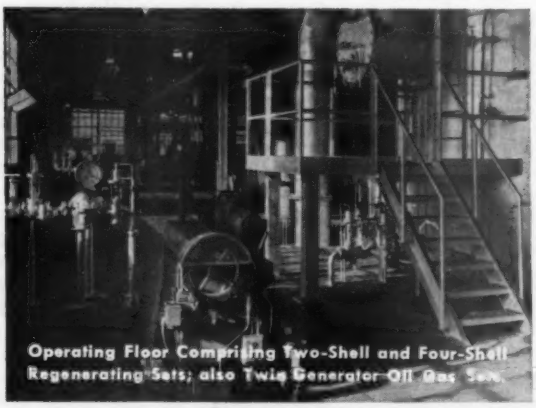
Three installations of Gasmaco four-shell regenerative sets are in regular operation.

Two more four-shell sets are now under construction.

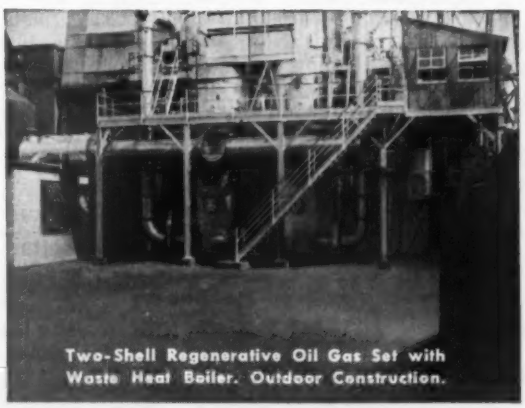
The Know-How and THE EXPERIENCE Counts!



Operating Floor, Two-Shell Regenerative Oil Gas Set.



Operating Floor Comprising Two-Shell and Four-Shell Regenerating Sets; also Twin Generator Oil Gas Set.



Two-Shell Regenerative Oil Gas Set with Waste Heat Boiler. Outdoor Construction.

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News of the Gas Industry

E. J. Baechle Elected President Of Stacey Manufacturing

Edw. J. Baechle

Edw. J. Baechle has been elected President of The Stacey Manufacturing Co., Cincinnati. He succeeds the late Alvin A. Ranshaw.

Mr. Baechle has been associated with the company for over 35 years. During that period he has held various posts, including the office of plant manager, secretary and treasurer and executive vice-president. He has served as a director of the company since 1923.

J. Thorpe Ranshaw was elected to fill the office of executive vice-president.

The Stacey Manufacturing Co. is celebrating its 100th anniversary this year.

L. E. Seeley Elected President Of ASHVE for 1951

Lauren E. Seeley, dean of the College of Technology and director of the Engineering Experiment Station, University of New Hampshire, Durham, has been elected 1951 President of The American Society of Heating and Ventilating Engineers, according to an announcement from the 57th annual meeting of the society in the Bellevue-Stratford Hotel, Philadelphia.

Dean Seeley succeeds Lester T. Avery of Cleveland.

Other officers elected are: first vice-president, Ernest Szekely, President of Bayley Blower Co., Milwaukee; second vice-president, Reg F. Taylor, consulting engineer, Houston; and treasurer, Howard E. Sproull, division sales manager, American Blower Corp., Cincinnati.

O'Connor Is Now a Consultant With H. Zinder & Associates

James V. O'Connor has become an associate of H. Zinder & Associates, utility consultants, Washington, D. C., according to a recent announcement.

Mr. O'Connor was formerly chief of the division of gas certificates, Federal Power Commission.

R. P. Briggs Joins Consumers As V-P, Finance

Robert P. Briggs, vice-president of the University of Michigan, has been elected vice-president and director of Consumers Power Co., according to an announcement by Justin R. Whiting, President of the company.

Mr. Briggs will specialize in matters of finance for Consumers Power Co., which has outstanding stocks and bonds valued at more than $350,000,000. This is a new office created in the Consumers' organization.

Mr. Briggs has been in charge of all business and finance of the university for the past six years, including a $35,000,000 building program. Dr. Alexander G. Ruthven, President of the university, announced that Mr. Briggs' resignation had been accepted with regret by the Board of Regents.

George W. Allen Retires As CGA Exec. Secretary

George W. Allen has retired as executive secretary and treasurer of the Canadian Gas Association after 35 years of service, the association announced recently.

He will be succeeded by Warner A. Higgins, who was previously a public relations consultant, writer and editor.

Until a suitable permanent location can be secured, a temporary office has been established. All correspondence should be addressed to Canadian Gas Association, P. O. Box 158, Terminal A, Toronto.

PUAA Again To Sponsor Contest For Better Advertising Copy

The Public Utilities Advertising Association is again sponsoring the PUAA Better Copy Contest, it was recently announced. This annual contest has been run continuously since 1923.

At the conclusion of the contest, 174 awards will be presented at the annual convention of the association in New York, May 17 and 18.

The award-winners will be reproduced in the 1951 PUAA national awards book, which will be sold at cost.

Rule books have been distributed to PUAA members. They are available from C. Fred Westin, Public Service Electric and Gas Co., 80 Park Place, Newark.

Gellert Chosen Board Member Of Industrial Conference

N. Henry Gellert

N. Henry Gellert, President of Seattle Gas Co., was elected a board member of the National Industrial Conference Board for a one-year term at the board's meeting held December 21 in the Waldorf-Astoria Hotel, New York.

The conference board, founded in 1916, is an independent, non-profit organization which gathers, tests, distributes and explains facts essential to the establishment of management, labor, governmental and economic policies. The board's work is supported by more than 3,000 business concerns, labor unions, trade associations, government agencies, libraries, colleges and universities.

C. G. Cooper Made Vice-president Of Cooper-Bessemer

Charles G. Cooper, manager of Cooper-Bessemer's Washington office, was elected a vice-president at the recent board of directors' meeting. "Mr. Cooper's election to vice-presidency," explained B. B. Williams, board chairman, "is partially in recognition of his important role of directing Cooper-Bessemer's efforts in this nation's defense program from the company's Washington office."

Elected a director of the company in 1945, Mr. Cooper has been responsible for the sales and servicing of government diesel and gas engine contracts, as well as all direct relations between Cooper-Bessemer and agencies of the US government.

Son of the late C. G. Cooper, former Cooper-Bessemer President, and grandson of Elias Cooper, one of the company founders, Mr. Cooper is a graduate of the Sheffield Scientific School of Yale University, 1926. He served as a field and service engineer with the Chapman Stein Co., former Cooper-Bessemer subsidiary, until 1931 when he joined Cooper-Bessemer's New York office as sales engineer. In 1933 Mr. Cooper established the Washington office that he has managed ever since.

Creigh Becomes Vice-President Of Kansas-Nebraska Natural

The promotion of Thomas Creigh, Jr., to vice-president in charge of engineering and gas supplies, has been announced by the Kansas-Nebraska Natural Gas Co., Hastings, Nebr.

Mr. Creigh was graduated from Wabash College in 1933 and joined Kansas-Nebraska three years later. Serving as construction inspector and assistant general manager, he was later made superintendent of the company's Otis, Kansas, dehydration plant. In 1939 he was appointed to the board of directors and made assistant to the President, serving in that capacity until he was made chief engineer in 1943.

The company also announced the appointment of W. P. Waller as general superintendent of distribution. Mr. Waller, who has been division manager at McCook, Nebraska, will move to the company's headquarters at Hastings.

L. J. Stelling, district manager at Central City, was appointed division manager of the company's operations in southwestern Nebraska and northwestern Kansas. He will make his new headquarters at McCook.

New Koppers Vice-presidents Are Appointed

General Brehon Somervell, President of Koppers Company, Inc., has announced appointment of three Chicagoans as divisional vice-presidents in the company's engineering and construction division.

The three are Gordon Fox, Harry Naismith and W. B. Clemmitt, all of whom have been affiliated with Freyn Engineering Co., a wholly-owned subsidiary of Koppers, or Freyn's subsidiary, the Open Hearth Combustion Co. Under action of the Koppers board of directors, Freyn has ceased to be a company subsidiary and became a department of Koppers engineering and construction division on January 1.

Activities of the Freyn department will be under the direction of W. C. Snyder, Jr., vice-president and manager of the metallurgical department of the engineering and construction division. The new Koppers department will continue to have offices in Chicago and no other changes in organization or operation are contemplated.

Mr. Fox, former executive vice-president of Freyn Engineering, is a graduate of the University of Wisconsin. Before joining Freyn in 1920, he was associated with General Electric and with the Youngstown Sheet & Tube Co.

Mr. Naismith is the former vice-president of the Open Hearth Combustion Co. A graduate of the Central State Normal College of Pennsylvania, Mr. Naismith had experience in open hearth construction and operation with several steel firms before joining Open Hearth as service engineer in 1929.

A former vice-president of Freyn Engineering, Mr. Clemmitt is a graduate of Lehigh University. He was associated with Republic Steel Corp., Inland Steel Corp., and Weirton Steel Co. Before joining Freyn in 1923, Mr. Clemmitt was chief engineer for the American Tar Products Co., now a part of Koppers tar products division.

Gas Appliances Are Flown To Colombia

Gas appliances constituted the largest individual commodity classification shipped by Pan American Airways from Miami to Colombia in 1950, with cargo clippers carrying 3,651 gas ranges and 325 water heaters to the South American country during the year.

The gas ranges are about evenly divided between two burner models, weighing 165 pounds, and four burner types weighing 325 pounds per unit. This million pound movement for the year required the space equivalent to 85 cargo clippers.

Manufacturers, including American Stove Co., Caloric and Philco, ship their stoves to Miami by railroad freight, where they are transhipped by air for the overseas portion of their journey. Cargo planes can carry 40 gas ranges or more on each flight.

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COMMONWEALTH ASSOCIATES · INC. ENGINEERING CONSULTANTS

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both in years and diversity of operations in electric and gas utility field.

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large enough to do the job yet small enough to insure proper personal executive attention to your immediate problems and requirements.

Commonwealth Services and its engineering subsidiary, Commonwealth Associates, are new in name and outlook, but long established in organization and experience. Formerly the service company for the Commonwealth & Southern Corporation, Commonwealth Services and Associates have drawn together a group of individuals highly specialized in varied technical and economic fields and whose experience in problems of electric and gas utilities covers over 40 years.

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Check the ways in which Commonwealth can contribute to the efficiency and economy of your organization. Write for booklet describing the many services available to you. Address: Commonwealth Services Inc., Department D1, 20 Pine Street, New York 5, N. Y.

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A. Gordon King Retires; with AGA 28 Years

A. Gordon King, secretary of the American Gas Association's manufactured gas department, operating section and accident prevention committee, retired under the AGA pension plan as of December 31, 1950.

Mr. King joined AGA on February 1, 1923 from the Pennsylvania Public Service Commission where for two years he had held the position of gas engineer. He had previously served as gas engineer for the Public Service Commission, second district, State of New York.

His activities with the association included field service work for member companies and lectures at educational institutions on technical matters pertaining to the gas industry. He has served as secretary of several AGA general committees, including standards and service rate fundamentals, aid in aviation, purging gas holders and gas works apparatus. During World War 2 he was secretary of the AGA committee on national defense. Since August 1940 Mr. King has been a secretary of the Association's technical section, now the AGA operating section.

Mr. King was trained and educated in England where he was first employed as a cadet engineer. He is the holder of numerous technical honors in gas manufacture and allied subjects. He is also a member of the Institution of Gas Engineers and is a licensed professional engineer in the state of New York.

Following gas company service in England, Canada and the United States, he served in the armed forces during World War 1. Prior to being called to active duty he was with Consolidated Gas Co. of New York for more than four years as an assistant engineer. Upon discharge from the army he joined a firm of gas fuel engineers in New York.

J. Stanford Setchell will carry on Mr. King's work for the operating section as secretary, manufactured gas department. Thomas J. Shanley, secretary AGA accounting committee, will work with the accident prevention committee as acting secretary of that group.

Mississippi River Fuel Gets OK To Test For Storage in Ill.

The Federal Power Commission has granted temporary authorization for Mississippi River Fuel Corp., of St. Louis, to construct facilities to test the gas storage possibilities of the Waterloo, Illinois, oil field.

The temporary certificate authorizes the company to drill and operate not more than seven gas wells and to construct four miles of 12-inch transmission pipe line. The facilities are part of a larger project proposed by Mississippi to develop the Waterloo field as an underground storage reservoir for natural gas.

The Waterloo field is located in Monroe County, Ill.

Edwin E. Hedene Dies Suddenly

Edwin E. Hedene, chief engineer of Nordstrom Valve Division, Rockwell Manufacturing Co. died on December 28 in Pittsburgh after a short illness. He was born in New England 54 years ago.

Prior to coming to Pittsburgh, Mr. Hedene was chief engineer of the Nordstrom Valve plant in Oakland, Calif., where for the major part of his 23 years service he worked directly with Sven Nordstrom, inventor and developer of Nordstrom valves. For the past several years he has devoted his efforts to coordinating the Nordstrom engineering activities at the Pittsburgh, Hopewell, Oakland and East Chicago plants.

Boshell Is Westinghouse Brake Chairman and President

Election of Edward O. Boshell, prominent utility executive, as chairman of the board and President of The Westinghouse Air Brake Co. and its subsidiary, The Union Switch and Signal Co., was announced Jan. 16 in Pittsburgh. Mr. Boshell has also been elected a director of both Pittsburgh companies. A. N. Williams, who has served as President of both companies since 1946, has been elected vice-chairman of the Board of the two organizations, the announcement said. Industrial Products Division of Westinghouse is a major manufacturer of compressors and control devices for the gas industry.

Election of Herbert A. May as senior vice-president also was announced.

Mr. Boshell has been chairman of the board and President of Standard Gas and Electric Co., New York, and of Philadelphia Company, Pittsburgh, since 1948, and he will continue in a consultative and advisory capacity to the utility organization. He is well-known in Pittsburgh business circles since he has been affiliated with Philadelphia Company and Duquesne Light Co. for the past three years.

Mr. Boshell was graduated from the University of Illinois School of Commerce in 1923 and received an LL.B. from the University of Illinois College of Law in 1926. In the same year, he was admitted to the bar in Illinois and became associated with the law firm of Knapp and Campbell in Chicago. In 1928 he became assistant general attorney for Consolidated Electric and Gas Co., of Chicago and New York, a position which he held until 1933, when he joined Stone and Webster Service Corp. as attorney. He became vice-president in charge of finance of Stone and Webster Service Corp. in 1938, and held that office until becoming associated with Standard Gas and Electric in 1948.

CONVENTION CALENDAR

February

16 AGA Great Lakes Personnel Conference, Palmer House, Chicago, Ill.

March

12-14 Mid-West Gas Association, Hotel Fontenelle, Omaha, Nebr.
13-16 National Association of Corrosion Engineers, Statler Hotel, New York.
26-27 AGA Residential Gas Section, Eastern Natural Gas Regional Sales Conference, William Penn Hotel, Pittsburgh.
29-30 NEGA Annual Meeting, Hotel Statler, Boston.
29-30 Oklahoma Utilities Association, Mayo Hotel, Tulsa.

April

2-4 AGA Sales Conference on Industrial and Commercial Gas, Shoreham Hotel, Washington.
3-6 Greater New York Safety Council, Annual Safety Convention and Exposition, Hotel Statler, New York.
10-12 Southwestern Gas Measurement Short Course, University of Oklahoma, Norman, Okla.
16-18 AGA Distribution, Motor Vehicles and Corrosion Conference, Hotel Peabody, Memphis.
16-18 GAMA, Annual Meeting, Drake Hotel, Chicago.
19-21 Florida-Georgia Gas Association, Spring Convention, Hollywood Beach Hotel, Hollywood Beach, Florida.
23-25 Southern Gas Association, Biloxi, Miss.
26-27 Indiana Gas Association, French Lick Springs, French Lick, Ind.

May

4 New Jersey Utilities Association, Spring Meeting, Seaview Country Club, Absecon, N. J.
7-8 AGA Natural Gas Department, spring meeting, Baker Hotel, Dallas, Texas.
7-9 Missouri Association of Public Utilities, annual convention, Jefferson Hotel, St. Louis.
14-16 AGA Production and Chemical Conference, Hotel New Yorker, New York.
15-17 Pennsylvania Gas Association, Wernersville, Pa.
17-19 Public Utilities Advertising Association Convention, Hotel New Yorker, New York.
27-30 American Society of Refrigeration Engineers, Spring Meeting, Hotel Statler, Detroit.

June

18-21 Canadian Gas Association, Bigwin, Lake of Bays, Ontario.
25-26 Michigan Gas Association, The Grand Hotel, Mackinac Island, Mich.

September

4-6 PCGA Convention, Fairmont Hotel, San Francisco.

October

15-17 AGA Annual Convention, St. Louis.

East Ohio Wants Authorization For Line To Carry More Gas

The East Ohio Gas Co., Cleveland, has asked the Federal Power Commission to authorize construction of a 65 mile, 26 inch pipe line which would carry an additional supply of natural gas into the company's system to meet increasing demands in northeastern Ohio.

The proposed line, estimated to cost $4,382,170, would connect with the system of New York State Natural Gas Corp. at a point on the Ohio-Pennsylvania state line, near Petersburg, Ohio, and extend northwesterly to a point in Summit County, Ohio. New York State Natural, an affiliate of East Ohio in the Consolidated Natural Gas Co. system, would deliver gas to East Ohio at the Petersburg connection.

Kluberg Chosen Comptroller Of Consumers Power

Justin R. Whiting, President of Consumers Power Co. has announced appointment of John W. Kluberg as comptroller of the company, succeeding the late H. B. Hardwick who died December 28.

Mr. Kluberg has been associated in the affairs of Consumers Power Co. for several years through his work with Arthur Andersen & Co., independent accountants and auditors who have handled the annual audits for this company. Mr. Kluberg was formerly in the Detroit office of the Andersen organization.

United Asks FPC for Facilities In Gulf Coast Off-Shore Fields

United Gas Pipe Line Co., Shreveport, has applied to the Federal Power Commission for authority to construct and operate natural gas facilities in the off-shore fields in the Gulf of Mexico off the coast of Louisiana.

The company is proposing to build about 12 miles of 14-inch line extending from the Pure Oil Company's platform southwesterly to a platform operated by Magnolia Petroleum Co., Continental Oil Co. and Newmont Oil Co. A second section of line, 10 inches in diameter, approximately 14 miles long, would extend from the latter point southerly to another platform operated by Magnolia, Continental and Newmont.

United said that under terms of its contract with Magnolia, United is not required to construct the 14-mile portion of line until the demonstrated reserves in Magnolia's offshore fields are one trillion cu. ft. or more. If Magnolia builds the line and it is later determined that the reserves exceed one trillion cu. ft., then United will seek authority to acquire the line, the application states.

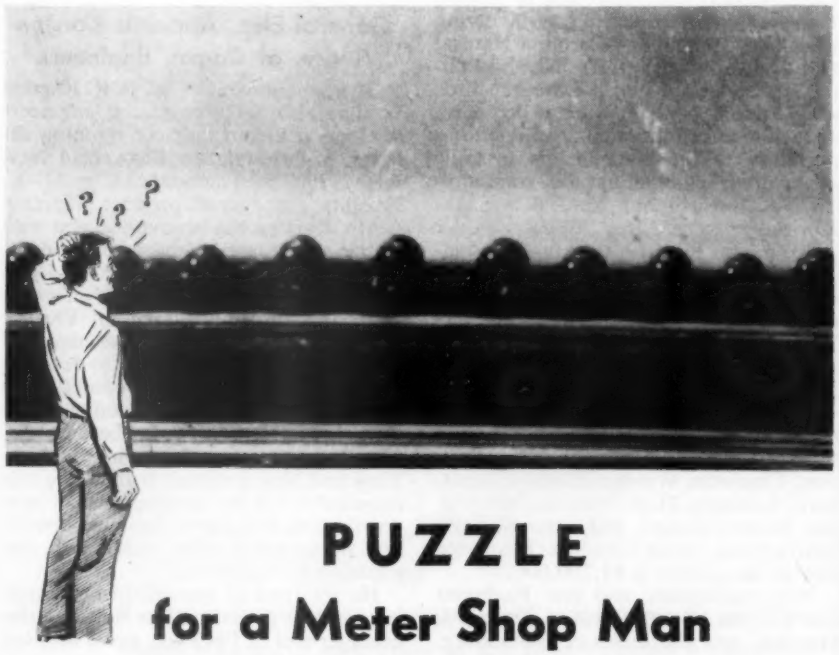
Estimated cost of the 12-mile section of line is $1,279,657, and the 14-mile portion is estimated to cost $1,222,445 —for a total of $2,502,112.

FPC Rejects Northeastern Plan To Serve All New England

The Federal Power Commission has rejected an application by Northeastern Gas Transmission Co. to supply natural gas to the entire New England area. This action leaves in effect a commission order of November 8, giving a portion of the New England market to Northeastern and the remainder to Algonquin Gas Transmission Co., should the latter demonstrate it has an adequate gas supply.

Gardiner Symonds, President of Tennessee Gas Transmission Co. and chairman of Northeastern, said the decision "can cost New England gas consumers at least $3,000,000 annually in higher gas rates." He said he would appeal the decision to the courts.

On November 8, the commission authorized Northeastern to supply natural gas to communities in Connecticut, northern and western Massachusetts, and parts of New Hampshire. On December 21, Northeastern applied for the entire New England market, contending such a grant would conserve steel needed for defense and about halve the cost of two competing pipe lines in the area, thus cutting costs to consumers.



PUZZLE
for a Meter Shop Man

What is it? It's an unretouched photo showing how firmly VULCAN Diaphragms are sealed to the metal rings.

Those little beads in the enlarged photo are bubbles of cement which have oozed out under the firm and constant pressure supplied by the tie-down wire.

VULCAN Diaphragms are securely bonded to the rings. For additional safety, all seams are vulcanized. Each diaphragm is factory-tested for tightness.

Absence of gas leakage is only one of many features that make VULCAN Diaphragms superior. Join the growing trend to VULCAN—the modern diaphragms for meters, regulators and controls.

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RUBBER PRODUCTS, INC.
(Formerly Vulcan Proofing Company)
FIRST AVENUE & 58th STREET • BROOKLYN 20, N. Y.
CHICAGO OFFICE: 333 North Michigan Ave., Chicago 1, Ill.

FPC Authorizes Piedmont Natural To Serve Part of Carolinas

The Federal Power Commission has affirmed, with certain modifications, the initial decision of a presiding examiner authorizing Piedmont Natural Gas Co., Inc., of Spartanburg, S. C., to serve natural gas markets in North and South Carolina by constructing a series of lateral pipe lines extending from the system of Transcontinental Gas Pipe Line Corp.

Applications of two other companies which sought to render area wide service in the Carolinas were denied insofar as they relate to serving the markets Piedmont Natural was authorized to supply. However, the proceedings involving these two companies—Carolina Natural Gas Corp. of Charlotte, N. C., and Public Service Co. of North Carolina, Inc., of Gastonia, N. C.,—were ordered reopened to afford those companies an opportunity to file amendments to their applications eliminating the communities which Piedmont Natural was authorized to serve.

Examiner Edward B. Marsh's decision, as adopted by the commission, also authorizes Transcontinental to increase the sales capacity of its Texas-to-New York City pipe line by 50 million cu. ft. per day, of which up to 22 million cu. ft. will be delivered to Piedmont Natural.

The Piedmont Natural project includes six lateral lines, aggregating 73.7 miles, to serve the following communities: Charlotte, Winston-Salem, Greensboro, Salisbury, High Point and Burlington, North Carolina; and Greenville and Spartanburg, South Carolina. Estimated cost of the project is $1,200,000.

The commission said that Piedmont Gas Co., Inc., South Carolina Electric & Gas Co. and the cities of Blacksburg, Laurens, Clinton and Newberry, S. C., should be afforded an opportunity to submit further evidence with respect to their need for obtaining natural gas from Transcontinental. The examiner found that capacity in Transcontinental's project should not be reserved for these companies and cities on the basis of the present record.

The FPC ordered Piedmont Natural to maintain for 90 days from the date of issuance of the order, its offer to transport through its proposed Greensboro-Burlington lateral line, natural gas from Transcontinental's system for the use and benefit of distributors beyond Burlington, N. C.

William P. Wallace, 42, Dies: Brooklyn Union Employee

William P. Wallace, assistant engineer of distribution, Brooklyn Union Gas Co., died recently after an operation. He was 42 years old.

Mr. Wallace joined Brooklyn Union in 1930 as a cadet engineer. He served in the distribution department as a superintendent's assistant and became engineer's assistant in 1941. In 1945 he became assistant engineer of distribution.

1949 'Statistics of Natural Gas Companies' Issued by FPC

The Federal Power Commission has announced that its 1949 edition of its annual publication "Statistics of Natural Gas Companies" is now available, and that copies may be obtained from the publications section of FPC, 1800 Pennsylvania Avenue, NW, Washington 25, D. C., at $2.00 per copy.

The publication gives the operating revenues of the natural gas companies filing reports with FPC, sales of gas, and other financial and operating data compiled from the reports filed with the commission by 122 natural gas companies.

General Elec. Appoints Karsten Suprv. of Comm. Engineers

The appointment of W. F. R. Karsten as supervisor of commercial engineers at General Electric air conditioning department headquarters, Bloomfield, New Jersey, has been announced by G. K. Iwashita, manager of product planning.

Mr. Karsten has been associated with the air conditioning department since its inception at Schenectady, N. Y. in 1932. Upon graduation from the University of Wisconsin, he joined General Electric on test and spent one year in advanced engineering. He was assigned to development of heating and air conditioning equipment in 1932 and was active in that phase until 1936 when he became district commercial engineer in the New York and New England districts; he was responsible for the development of new distribution, training and guiding distributor personnel in sales, installation, application and service.

He returned to Bloomfield headquarters in 1940 as assistant to division sales manager and in 1943 was made division sales manager.

H. Emerson Thomas Announces Personnel Changes

H. Emerson Thomas, President of the Pennsylvania & Southern Gas Co., has announced the transfer of C. C. Lamar as manager of the Elizabeth & Suburban Gas Co., Elizabeth City, North Carolina, to manager of the Elkton Gas Co., Elkton, Maryland.

Mr. Lamar has been associated with the gas industry for more than 30 years and joined the Pennsylvania & Southern group as manager of Elizabeth & Suburban five years ago.

Mr. Thomas also announced the resignation of P. C. Williams who has been manager of the Elkton Gas Co. since 1929. Mr. Williams will be retained temporarily on a consulting basis relative to local operations.

Mr. Thomas announced the appointment of F. Leroy Olvey as manager of the Elizabeth & Suburban Gas Co. Mr. Olvey has previously been employed by Lawrenceburg Gas Co., Lawrenceburg, Indiana, the Peninsular Gas Company, Calumet, Mich., and Indiana Gas & Water Company, Indianapolis.

Cooper-Bessemer Increases San Francisco Staff

The Cooper-Bessemer Corp., builder of diesel engines, gas engines and compressors, has announced the appointment of Walter H. Kraemer to its field sales and service office in San Francisco.

A graduate of Purdue University in 1948, Mr. Kraemer holds a bachelor of science degree in mechanical engineering. Since graduation he has been associated with Cooper-Bessemer where he has been actively engaged in diesel sales efforts. Mr. Kraemer has also been associated with Cooper-Bessemer's recent development of new nodular iron, working directly under T. E. Eagan, Cooper-Bessemer chief metallurgist, and L. F. Williams, assistant to the president.

AGA Announces Date and Plans Of Industrial Gas School

The 1951 Industrial Gas School will be held in Pittsburgh at the William Penn Hotel during the week of May 14, the Industrial and Commercial Gas Section of the American Gas Association recently announced.

The sales training committee, with Terry Hart as chairman, has developed a five day advanced and refresher course for industrial gas men. Anyone concerned with industrial gas processing, including plant and production engineers of large industrial consumers, may attend.

Home Service Workshop

(Continued from page 34)

cluded a description of a home service promotion in a department store by Beatrice Cole Wagner, Philadelphia Gas Works Co.; a training program featuring an Old Stove Round Up given by Betty Jane Frahm, Bismarck, North Dakota; and a hat show demonstration as a tie-in with the spring style show that was featured by Ruth Pocock, Ann Arbor, Mich. Dorothy Dean, East Ohio Gas Co., outlined demonstrations that were designed to educate dealer salesmen in the finer points of gas appliances.

A series of five minute color films on gas cookery available as television shorts or for educational movies, was shown. These films, featuring a series of cooking achievements by a teen ager, were made under the supervision of home service in Southern California Gas Co.

Mary E. Huck, Ohio Fuel Gas Co., Columbus, gave a demonstration of the use of showmanship in a cooking school. Her company has a traveling cooking school that visits all parts of the company's extensive territory.

D. A. Hulcy, President of AGA and President, The Lone Star Gas Co., Dallas, was the guest speaker at the closing luncheon conference. He urged the home service girls to aid in keeping the gas companies at their present high point in the nation's life.

FPC Approves Natural Gas For Watertown, N. Y.

The Federal Power Commission has granted proposals of New York Natural Gas Corp., of New York City, and Niagara Mohawk Power Corp., of Syracuse, involving natural gas service to Watertown and other communities in northeastern New York State.

New York State Natural was authorized to make additional sales of gas to Niagara Mohawk, which in turn received authorization to build a 55-mile, 10¾-inch pipe line from Fulton, N. Y., to Watertown. Estimated cost of Niagara Mohawk's project is $1,991,000.

The authorization will enable Niagara Mohawk to convert its present manufactured gas territory in Watertown to straight natural gas service. In addition, Niagara Mohawk will provide straight natural gas along the route of the new line in the towns of Mexico, Pulaski, Mannsville, Adams, Adams Center, Sandy Creek and Lacona.

The FPC conditioned both authorizations to require the two companies to file a service agreement requiring New York State Natural to supply Niagara Mohawk with all of the natural gas required by the present and future domestic and commercial consumers served by Syracuse Suburban Gas Co., within its distribution territory in Onondaga County, N. Y., and all normal expansion within this territory.

Officers and Directors Elected By Oklahoma Utilities Ass'n

Oklahoma Utilities Association has announced new officers, directors, and convention dates for 1951.

C. N. Robinson, vice-president, Public Service Co. of Oklahoma, Tulsa, has been elected President of the association.

First vice-president is Richard W. Camp, vice-president, Consolidated Gas Utilities Corp., Oklahoma City.

W. R. Wolfe, vice-president, Oklahoma Gas & Electric Co., Oklahoma City, is now second vice-president of the association.

H. H. Ferrin, vice-president and treasurer, Oklahoma Gas & Electric Co., is treasurer.

Miss Kate A. Niblack, Oklahoma City, was re-elected secretary. The following have been elected directors of the association: E. C. Joullian, President, Westoc Oil and Gas Co., Oklahoma City; W. R. Thomas, manager, Southwest Natural Gas Co., Ada; Carl E. Cloud, general superintendent, Oklahoma Natural Gas Co., Tulsa; Dale E. Frieden, manager, Zenith Gas System, Inc., Alva; R. K. Lane, President, Public Service Co. of Oklahoma, Tulsa; Malcolm Morrisson, assistant to president, Oklahoma Gas and Electric Co., Oklahoma City; A. F. Potter, district manager, Gas Service Co., Bartlesville; and D. J. Tuepker, director, Public Service Co. of Oklahoma, Tulsa.

The Oklahoma Utilities Association convention will be held March 29 and 30 at the Mayo Hotel, Tulsa.

A. Virgil McRee Is Dead

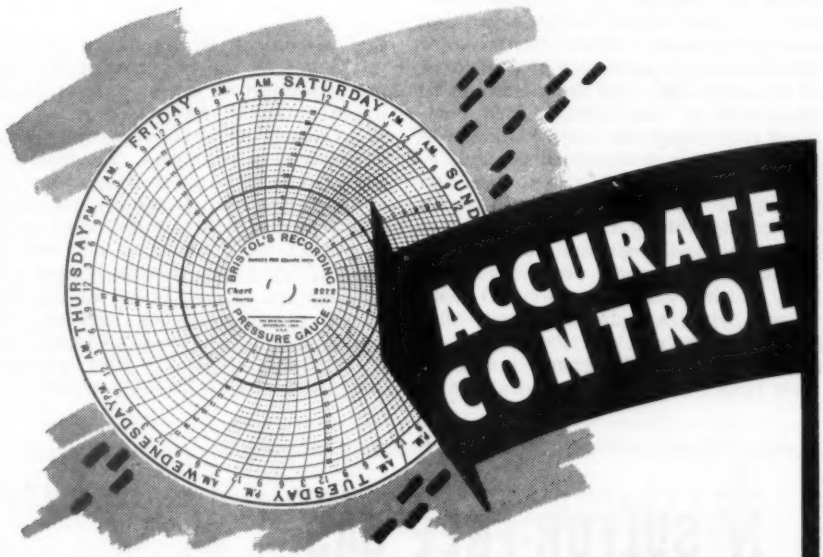
A. Virgil McRee, secretary of Michigan Consolidated Gas Co., died at his home in Detroit on December 27, following a long illness. He was 50 years old and had been in the employ of the company 22 years.

Mr. McRee was born in Dresden, Tennessee, in 1900. Following his graduation from high school in Murray, Kentucky, he entered the University of Kentucky and was graduated with a degree of bachelor of arts in 1923. After coming to Detroit and entering the employ of the gas company in a minor capacity, he attended law school nights and in 1931 was graduated from the Detroit College of Law with a degree of juris doctor, the highest legal scholarship honor obtainable in that school.

Eight years after entering the employ of the gas company he was elected to his first executive position, becoming assistant secretary in 1937.

Three years later he was made assistant secretary-treasurer of the company, and in 1944 became secretary.

Mr. McRee was also secretary of the Michigan-Wisconsin Pipe Line Co. during the four year period of the development and construction of the line, and at his death was secretary of the Austin Field Pipe Line Co.



Reynolds Service Regulators are built to meet specific requirements — years of operation in the field through a complete range of operating conditions have proved not only their superiority but their durability. With parts so precisely machined for each model that they are completely interchangeable. The accuracy you require in performance is assured.

MODEL 10

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20

Dead Weight or Spring Type, with or without Mercury Seal, or Dead Weight Safety Seal or diaphragm operated relief valve. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30

For horizontal or vertical connections, with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal or diaphragm operated relief valve.

Reynolds Gas Regulator Co.

ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

Rockwell Offers Displacement Meter for 1000 psi Service

The first high-capacity positive-displacement meter capable of handling gas at pressures up to 1000 psi has been announced by Rockwell Manufacturing Co., Pittsburgh, Pa. Before such diaphragm-type meters have not been useable above 500 psi—even though transmission pressures upward from this limit are becoming increasingly frequent.

The new meter, No. 2½ Rockwell for 1000 psi working pressure, weighs 950 lb, is encased in high-tensile alloy steel castings with 1¼-inch studs joining the body and cover, and has capacities of 31,000 and 46,000 cfh of gas (on a 4 oz basis) at pressure drops of 6 and 10 inches wc respectively. Its index plate carries combination drillings so that standard indexes (vertical, horizontal or direct-reading) can be oriented in either of two directions, and the meter can be fitted with a 7-day clock-driven combined record gage for easy conversion of actual volumes to corrected volumes.

Design features are: (1) the unusual ribbing of the heavy cast body (with part of the ribbing internal and part of it external) so that stresses are uniformly distributed around the periphery of the body and less metal (and weight) is involved with adequate strength and safety factors; and (2) the support of all moving and working parts on a single plate held between body and cover so that alignment is permanent and all working parts can be removed as a unit for inspection or repair without taking the meter out of the line.

The new Rockwell meter.

A 2-inch series-60 ring-joint flange connection is employed, but flat-faced series-60 flanges can be provided at the option of the user. Internally, the meter is provided with: (1) three relief valves to protect the diaphragms and mechanism, (2) gear-type valve movement with ball bearings, (3) a Teflon stuffing box which greatly reduces service, (4) leather diaphragms with increased diaphragm port areas, (5) four case and diaphragm drains for easy removal of condensate, so arranged that the internal drain valves are accessible through the external drain plugs by simple screwdriver; and (6) up to date bakelite valves.

Outside dimensions are 30⅞" between connection flanges, 22¼" depth, and 26-15/16" height to index-plate.

State Statute Necessary

(Continued from page 20)

officials or employes misrepresented or concealed known facts from the consumer or were negligent. Otherwise the company is not liable.

Hence, the fact that gas company officials accept an application for gas, when erroneously believing that gas is available, does not render the company liable for its failure to subsequently supply gas to the consumer.

For example, in Merryman, 153 Md. 419, it was disclosed that officials accepted an application believing that the main gas line had been extended to the property to which the service was to be supplied. In subsequent litigation the higher court promptly held that the acceptance of the application by the gas company for service created *no* obligation to supply the gas. Hence the company was not liable for failure to supply gas to this property.

SULFUR-FREE GAS

AT LOWEST COST

WITH IRON SPONGE

Iron Sponge is a concentrated purification material that operates with high efficiency at high or low pressures, has excellent capacity and activity, gives long service between foulings and is simply and quickly regenerated. This is why Iron Sponge has been preferred for H_2S removal for over 75 years.

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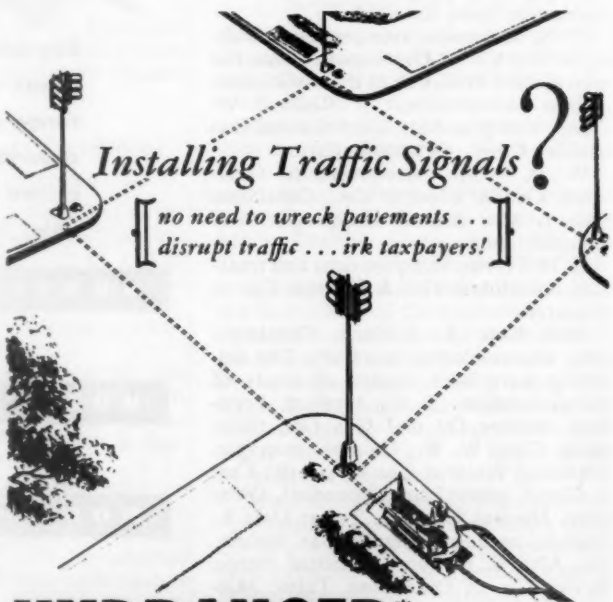

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681 Market Street
San Francisco 5, California

GET CATALOG TODAY! HY-218

R. A. Bissell Appointed Chairman Of Sales Promotion Committee

R. A. Bissell, sales promotion manager, Bryant Heater Division, affiliated Gas Equipment, Inc., Cleveland, has been appointed chairman of the sales promotion committee, gas water heater division, Gas Appliance Manufacturers Association.

Mr. Bissell served on the sales promotion committee last year and was active in the "Court of Flame" automatic gas water heater campaign. He was formerly gas heating supervisor for the Brooklyn Union Gas Co., and is presently serving on the water heating committee of American Gas Association.

AGA Announces Sales Conference On Industrial & Commercial Gas

The annual AGA sales conference on industrial and commercial gas will be held at the Shoreham Hotel, Washington, April 2, 3, and 4, according to an announcement by the American Gas Association, Industrial and Commercial Gas Section.

The three day conference will be divided so that the first day will be commercial gas day, then an all-day general session, and finally industrial gas day. A program of subjects and speakers has been arranged by a committee under the chairmanship of F. T. Brooks, of Philadelphia Electric Co.

Robertshaw-Grayson Announces Traveling Service School

Excellent picture of "learning how."

A field service program to educate service men in the maintenance and servicing of temperature controls has been field-tested by the Robertshaw and Grayson divisions of the Robertshaw-Fulton Controls Co., for several years, and is now available on a national basis.

This program, which covers both domestic and commercial controls, was developed with the thought of aiding the gas industry in training their service personnel.

In the service school, service men participate in the program. During the school session, lasting about three hours, the service men actually operate the controls with "live" gas; then dismantle, adjust and rebuild them under the supervision of factory-trained instructors. Service tips are offered concerning the servicing and application of controls and their related appliances.

All equipment is supplied by Robertshaw-Grayson and transported in a converted station-wagon. Inquiries should be addressed to the sales department of either Robertshaw Thermostat Co. Youngwood, Pa., or Grayson Heat Controls, Lynwood, Calif.

John Avery Dies Suddenly; Roots-Connersville Pres.

John Avery, President of Roots-Connersville Blower Corp. since 1946, succumbed to a heart attack on January 13. Mr. Avery was a native of Boston, and graduated from the US Naval Academy with the class of 1923. His first industrial experience was with General Electric.

In 1936 he became a project engineer for Brown-Boveri Co., of Switzerland, and from 1932, until joining Roots-Connersville, he was connected with Allis-Chalmers Manufacturing Co. in Milwaukee. Mr. Avery was active in atomic development work during World War 2, and received the Kellex Key for outstanding service. His experience was extensive in the blower and compressor field.

Mr. Avery was a member of the executive board of the Machinery & Allied Products Institute, and a director of the Compressed Air & Gas Institute.

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LIGHTWEIGHT MODEL

One Man Operation On Every Application

HIGHLY EFFICIENT

IMMEDIATE SHIPMENT

Free Demonstration and Operating Instructions

Catalog No. 25M On Request

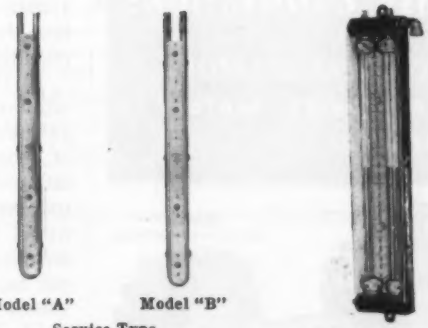
JOSEPH G. POLLARD CO., INC.

Pipe Line Equipment

New Hyde Park **New York**

NORWALK MANOMETERS

For Water, Mercury, Oil or Glycerine



Model "A" **Model "B"**

Service Type Ideal for Serviceman's Kit

Heavy Duty Type

For pressure or vacuum use. Made in all sizes and types. Service Type has unbreakable tubing and will stand abuse. Send for bulletin 3100M for complete data and prices.

NORWALK VALVE COMPANY

South Norwalk, Conn.

Manufacturers of Norwalk-Connelly Regulators since 1878

Canadian Gas

(Continued from page 10)

mentioned requirements that established reserves of the order of four and one-half trillion cubic feet are required.

9. The board finds that, taking into consideration:

(a) established reserves as estimated by the board,
(b) requirements of the Province for thirty years as estimated by the board,
(c) deliverability of gas to meet the thirty year requirements of the Province as estimated by the board,
(d) requirements of the various applicants who have been heard by the board,
(e) the policy of the Government with respect to Canadian preference;

it cannot at this time recommend the granting of a permit to remove gas or cause it to be removed from the Province to any of the applicants.

10. The board believes that the natural unfavorable load factor characteristics of the Provincial market could and should be alleviated in the future through the further development of storage projects.

11. The board recommends that the following applications be continued until September 4, 1951:

Westcoast Transmission Company Limited and Westcoast Transmission Company Ltd.,
Northwest Natural Gas Company and Alberta Natural Gas Grid Limited,
Western Pipe Lines,
Prairie Pipe Lines Limited,
McColl-Frontenac Oil Company Limited and Union Oil Company of California;

and further recommends that upon application to the board of any of the aforesaid applicants to have their case re-opened, prior to September 4, 1951, because of new evidence they wish to adduce, the board, upon being satisfied that such evidence warrants it, may fix a date prior to September 4, 1951, to hear the evidence and reconsider the application.

12. The board believes it is in the best interests of the Province to encourage gas development, and that if as a result of more intensive exploration and the establishment of further gas reserves, a successful trend is indicated, the board would be prepared to consider recommending the granting of an export permit based upon a lesser degree of provincial protection.

13. While the board does not recommend export at this time, it believes that with the further development of established reserves and the development of promising strikes, the situation could change rapidly whereby export could be permitted. This, in the opinion of the board, would be in the best interests of the Province and of Canada.

Coincident with publishing the board's report Premier Ernest C. Manning of Alberta made a statement, saying in part:

The Government is satisfied that the board has made a thorough and comprehensive investigation into the matter of Alberta's gas reserves and the provincial requirements and concurs in its conclusions and recommendations.

The Government concurs fully in the board's further conclusion that as quickly as additional reserves are established it will be in the best interests of the people of Alberta to make surplus gas available for sale outside the Province.

By carrying out the recommendations of the board's interim report we should experience an accelerated exploration and drilling program for natural gas.

If due to the uncertain international situation it should develop that Alberta gas is needed urgently for defence purposes, the Government will give immediate consideration to any official request from the proper authorities knowing that the people of Alberta are ready and prepared to play their full part in any program necessary to the security and defense of this continent.

The opening of a new addition to the factory building of Lancaster Meter Parts, Lancaster, Ohio, was announced by Karl Schaus, owner and general manager.

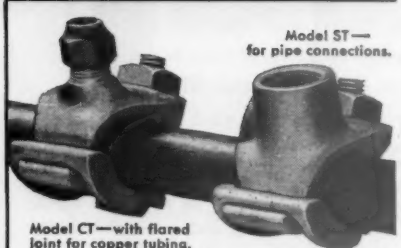
In the picture, the new structure is to the left of the original building.

Expanding business has necessitated the additional space for offices, a laboratory, and more production area, according to Mr. Schaus. The company, founded in 1926, manufactures the Waddell type diaphragms under the trade name of Lancaster metal rim diaphragms. These diaphragms came about as a result of complying with the suggestions of gas men acquainted with the operation of meters, Mr. Schaus said.

Quick easy way

TO MAKE GAS AND WATER CONNECTIONS

FOR REFRIGERATORS, LAUNDRIES, WATER-HEATERS, ETC.



SKINNER-SEAL SADDLE TEE—for making gas and water connections. No pipe cutting or threading. Quick. Easy. Cuts costs. For gas refrigerators, home laundries, heaters, etc. Write for circular.

Approved by Underwriters' Laboratories, Inc.

M. B. SKINNER CO.
SOUTH BEND, 21, IND., U. S. A.

Pit-Type Furnaces Described In New Bulletin

A new bulletin (SC-149) describing pit-type furnaces for controlled atmosphere heat treatment has just been issued by Surface Combustion Corp., Toledo 1, Ohio.

Performance data, engineering construction features and applications are covered in this new bulletin. The application of the furnaces to heat treatments such as gas case carburizing, homogeneous carburizing, dry cyaniding, clean hardening and bright annealing are presented.

New developments in this type of furnace are presented in detail complete with illustrations.

Classified

AUSTRALIA

GAS AND FUEL CORPORATION OF VICTORIA

Applications returnable to the Secretary, Premier's Department, Melbourne, C.2, by 31st March, 1951, are invited for appointment to the Office of Chairman of Directors of the Gas and Fuel Corporation of Victoria, under the Gas and Fuel Corporation Act 1950.

The Corporation is empowered to carry on the businesses of production, sale and supply of Town Gas, the gasification of brown coal by the Lurgi high pressure gasification process, the recovery, manufacture and sale of coke, tar, pitch, ammonia, dyes and other residual and synthetic products, also by-products and residuals arising in the manufacture of Town Gas.

The salary is £5,000 per annum. Full details of the functions and scope of the Corporation are contained in the Victorian Gas and Fuel Corporation Act 1950, copy of which is available for perusal at the Office of the Australian Consulate General, New York.

WANTED GRADUATE HOME ECONOMIST

Experienced in natural gas utility field to take responsible charge of new department in Albuquerque, New Mexico, one of the fastest growing cities in the Southwest. Must have pleasing personality, neat appearance, age 25 to 35. Guaranteed monthly salary, pleasant working conditions, numerous attractive employee benefits after period of regular employment. Submit abstract of experience, qualifications, employment history, to Mr. Tom Corr, District Manager, Southern Union Gas Company, Box 1692, Albuquerque, New Mexico.

WANTED IMMEDIATELY

ENGINEER experienced in natural gas utility field by one of fastest growing natural gas companies in Southwest. Must have following qualifications. More than 30 years of age. Prefer person with college degree in engineering: petroleum, civil or mechanical. At least three years of college and five years of experience with natural gas or natural gasoline company, including the following phases—drafting, compressor station design and operation, hydrogen sulphide removal plants, gas well testing, gas measurement, drilling operations. Salary commensurate with experience. Pleasant working conditions, numerous attractive employee benefits after period of regular employment. Location in Dallas, Texas. Submit abstract of experience, qualifications, employment history to Box 227, c/o American Gas Journal Inc., 205 E. 42nd St., New York 17, N. Y.

FOR SALE

Machinery and equipment from one 6 foot and one 7 foot water gas sets. Includes G. M. seven valve automatic hydraulic nest; Cottrell electrical precipitator for detarring water gas; various hydraulic valves, instruments and meters. For further information address: Manager—Water, Gas & Electric Departments, Danville, Virginia.

POSITION WANTED

Desiring to change location. Prefer to be located in Mid- or Northwest section. Fourteen years of gas utility experience, managerial or supervisory capacities. Good record of productiveness. Thirty-seven years old. Address replies to Box 224, c/o American Gas Journal, 205 East 42nd Street, New York 17, N. Y.

POSITION WANTED: Eighteen years Gas Engineering experience. Capable of training service men on all types of gases. Qualified to run Gas Change-overs. Also industrial-combustion applications of all kinds. Prefer Gas Company or Utility Company in South or Southwest. Address Box 226, c/o American Gas Journal Inc., 205 East 42nd Street, New York City 17.

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GAS CONVERSIONS— TO NATURAL GAS TO OIL GAS

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GAS CONSTRUCTION & SERVICE CO., INC.
217 Broadway New York 7, N. Y.

CONVERSIONS AND SURVEYS, Inc.
Gas Conversion Specialists
Conversion without Confusion
90 BROAD STREET NEW YORK 4, N. Y.

COAL AND COKE HANDLING
Complete engineering and installation service for coal and coke handling, screening, crushing, skip hoists and storage bins, including alterations to existing conveying and screening plants.
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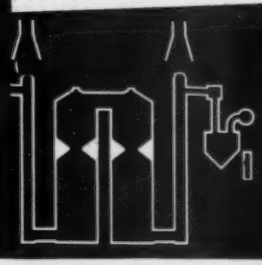

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GPM
IRON HYDROXIDE
The mark of unerring dependability in purification

GAS PURIFYING MATERIALS CO., INC.
3-15 26th Ave.
Long Island City 2, New York

Rockwell Acquires Pittsburgh Valve & Fittings Co.

W. F. Rockwell, Jr., President of Rockwell Manufacturing Co., Pittsburgh, Pa., has announced the acquisition of both the Pittsburgh Valve and Fittings Division of the Pitcairn Corp. and the Pittsburgh Valve and Fittings Corp., a subsidiary of Pitcairn.

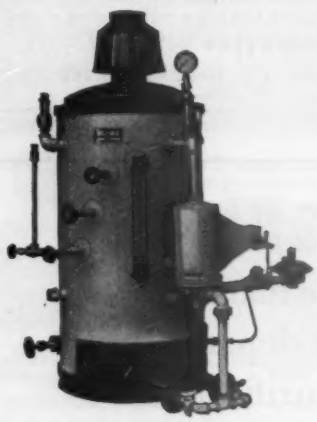
Rockwell paid approximately $3,000,000 for the assets of this corporation. It was a cash and stock transfer deal. Manufacturing facilities and principal offices of Pittsburgh Valve are located in Barberton, Ohio. Company-owned warehouses were also acquired in Kansas City and Houston. Leased warehouses are maintained in Chicago and New York. The plant is located on a 38 acre tract and embraces a total of 400,000 sq. ft. of floor area.

During the past three years better than a half million dollars has been spent on improvements to the Barberton property. Present complement of the plant is between 700-800 employees.

Mr. Rockwell said that his company intends to expand the Barberton operation to make fullest use of the facilities for production of Rockwell products. He indicated that ultimately 2,000 people would be employed. The plant will be operated as one of Rockwell's meter and valve divisions under the direction of L. A. Dixon, vice-president.

R. G. Caouette, at present general manager in charge of manufacturing for the meter and valve division of Rockwell, will become general manager of the Barberton property. J. A. Strachan, general manager of sales of Pittsburgh Valve will continue in that capacity as will all district managers and a sales staff of 25 people.

LATTNER
INDUSTRIAL GAS BOILERS
1 H.P. to 45 H.P.



2 H.P. Jacket Type as used for humidifying gas mains.

P. M. LATTNER MFG. CO.
CEDAR RAPIDS, IOWA

Index of Yields

(Continued from page 35)

gas category. Yield on these amounted to only 5.22 per cent at last calculation and was the lowest of all the share groups.

The reason is not hard to find. Profits have been on the ascendency and prospects are improving, with the gas manufacturing utilities in the east now receiving plentiful supplies of natural gas and with the new natural gas line to the Chicago now well under way.

Recent new bond and stock offerings of the utilities have been well received. The market does not have any overhang of unwanted new securities and investment underwriting firms have been closely bunched in their bids for the new issues which have come to market.

Soundly situated securities of the gas industry should receive favorable demand as they find their way to market. Funds are ample and are on the increase. A tapering supply of new utility issues also may be in the making. Anticipated gas industry expenditures for plant and property in the next four years are only about 50 per cent of their high level of the past several years. Although budgeted construction expenditures of the electric utilities currently aggregate only slightly less than during the past several years, lagging production of turbines and scarcity of vital materials for the utilities themselves for commercial and industrial builders is expected to pare the property additions and improvements.

The utilities in their recent issues have obtained new money at a favorable interest cost. This is not expected to change radically, if at all, in the view of close observers of the new issue market.

No one can tell now what the interest rates on new securities will be, they say, but evidence of the supply-demand equation indicates little increase, if any. Due to extraordinary conditions the amount of new borrowing by the federal government cannot be estimated. Rates may be determined by such borrowings, and in the event of widespread war the treasury department might establish rates no higher than those now current.

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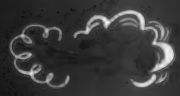
how to eliminate worry and big expense in gasholder operation

Does winter  mean sending crews to the top of your gasholder to chop it free? Or filling a huge reservoir with expensive anti-freeze? Does summer mean constant replacement of water or other sealant?

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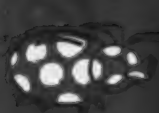
What's more, you can convert your present gasholders to many of the patented Wiggins advantages: safety , economy  , and simplicity.

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